JULY 18, 1960

PAPER TRADE JOURNAL

New Crowning Concept Analyzes All Rolls In The Calender Stack

Asphalt Successfully Dispersed In Elk Paper's New Two-Phase System

How Ozalid's Three-Story Machine Coats 79-Inch Sheet at 600 f.p.m.

Uniform Chips, Less Sawdust Via 6 Rules Of Chipper Maintenance

Editorial Dept.
University Microfilms, Inc.
313 N. First St.
Ann Arbor, Mich.

dyestuff makers
since 1859

has a fast yellow worth reading about

US RUBBER CONVEYOR BELTS

Note the perfection of training and troughing shown in this photograph.

Marathon-Southern's new mill is 100% equipped with "U. S." Conveyor Belts

United States Rubber literally has the run of the mill in the Marathon-Southern Corp.* mammoth unit at Naheola, Alabama. "U.S." Conveyor Belts are used as follows:

*Two U.S. Matchless® Conveyor Belts for log sorting.
*Two U.S. Matchless Conveyor Belts for use as chipper feed log belts.
*Six U.S. Oil-resistant Conveyor Belts (two running from chip conveyors to screens, two running from chip conveyors to silos and two more running from silos to chip conveyors).
*One U.S. Oil-resistant Conveyor Belt used as a digester feed chip conveyor.
*One Oil-resistant belt used as screen rejects conveyor.
*One Oil-resistant belt used as purchased chip conveyor.
*U.S. Giant Conveyor Belt used as refuse conveyor to boiler.
*Special Tan Natural Rubber Covered Belt used as stock conveyor from washer.
*Special Tan Natural Rubber Covered Belt used as stock conveyor to MD storage.
*U.S. Giant Conveyor Belt carrying coal to crusher house.
*U.S. Giant Conveyor Coal Stacker Belt.
*U.S. Giant Conveyor Belt carrying coal from crusher house to boiler.
*U.S. Giant Conveyor Belt used on coal reclaim feeder.

Marathon-Southern's selection of "U.S." Belts *exclusively* is due to their long-established record of low-cost haulage, durability and freedom from maintenance. This is another mill in which "U.S." demonstrates the kind of performance that has made it the foremost authority in belting.

The most comprehensive belting engineering information is available through your "U.S." Distributor. It will pay you to check with him.

US RUBBER Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

now DOUBLE BENEFITS

...Emerson showers plus reciprocating motion

"With Emerson Reciprocating Showers on the job the downtime saved from having to clean wires frequently has helped increase production nearly 5% on our wide variety of basis weights," says RUSSELL W. HAMILTON, Resident Manager, St. Regis Paper Company, Nashua River Division. *"Wire life has been lengthened too, in spite of increasing the machine speed more than 14% on the light basis weights.*

"Ridging and spots are eliminated because water pressure is equally distributed across the wire. Even if a nozzle becomes temporarily clogged the horizontal back-and-forth spray coverage makes up for it. Foreign materials have little chance of forming on the wire, which improves sheet formation."

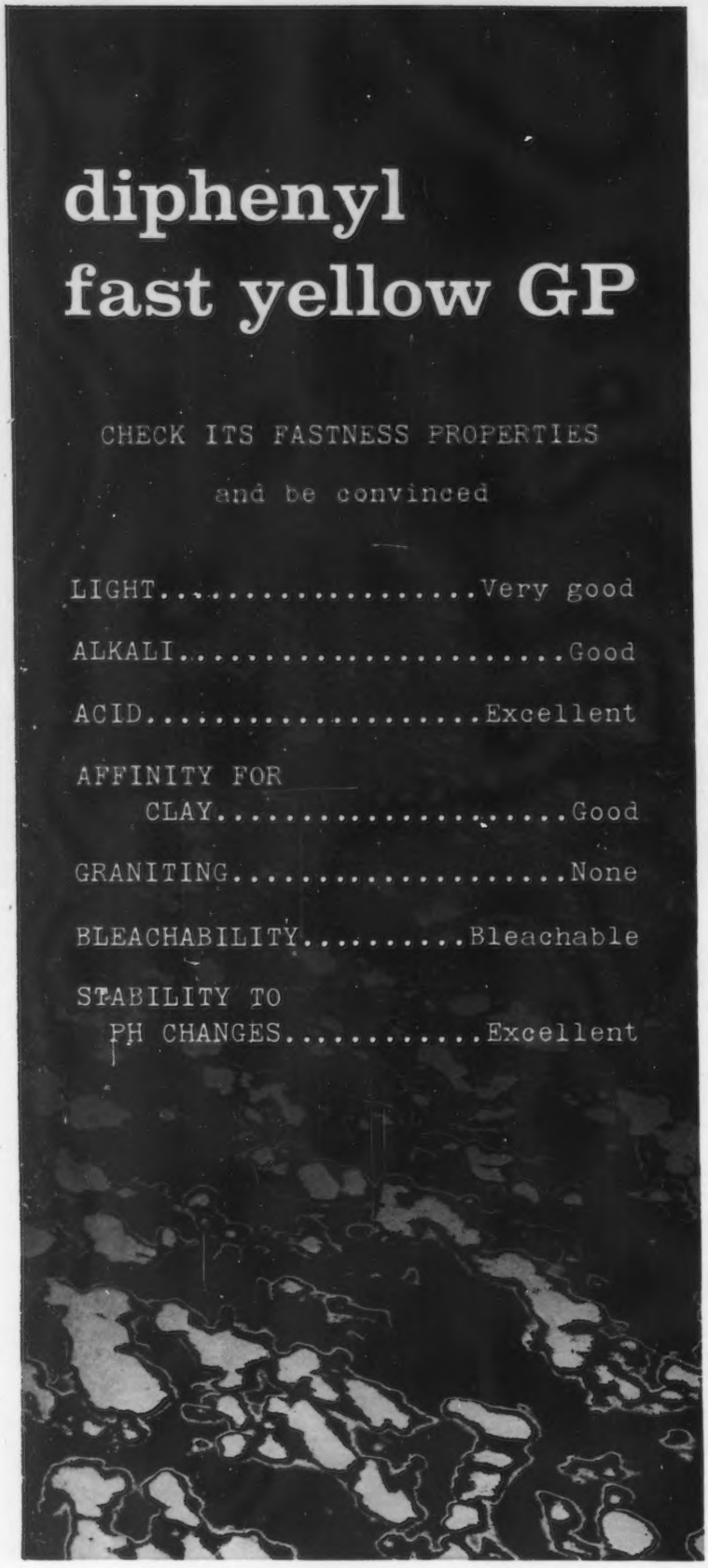
Designed for white water systems, as well as fresh, Emerson Reciprocating Showers hold water costs to a minimum and check the loss of solids. This is due to Emerson's internal clean-out mechanism. Stainless steel brushes, positioned opposite each nozzle, clear the openings of lumps by a simple twist of the handle. As brushes momentarily cover the nozzle openings, a valve opens to permit complete end-to-end flushing of the pipe.

Emerson Reciprocating Showers come in pipe diameters of from 1½ to 6 inches, in lengths to 376 inches. Each is engineered for its particular application with the proper nozzle size and spray pattern specified.

Pipe travel is provided by an automatic reversing pneumatic cylinder connected to the mill air supply. Speed of travel and length of stroke are easily adjustable. The cylinder may be mounted on either end, at either side of the pipe, which rides on spool-type, sealed bearing rollers. All reciprocating mechanism comes as a complete unit. It is easily, quickly installed with new showers, or with the showers already in operation.

If you want efficient, effective spray coverage and prolonged wire life — if you want to cut downtime and conserve water — if you want to step up production and improve sheet quality — install Emerson Reciprocating Showers. Call or write our sales representative nearest you, or The Emerson Manufacturing Co., Division of John W. Bolton & Sons, Inc., Lawrence, Massachusetts.

BOLTON EMERSON
TRADE MARK



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diphenyl fast yellow GP

"A Product of GEIGY Research"

It will pay you to investigate this low cost direct yellow for buff, ivory and goldenrod printing papers. Also suggested for board, tissue and kraft specialties. GEIGY'S technical staff will be glad to assist you in the adoption of this suggestion.

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PAPER TRADE JOURNAL

PUBLISHED WEEKLY SINCE 1872

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REMEMBER THESE DATES

August 22-24. TAPPI Alkaline Pulping Conference, Multnomah Hotel, Portland, Ore.

September 6-9. CPPA Summer Meeting, Technical Section, Banff Springs Hotel, Banff, Alberta, Canada.

September 18-21, NPTA Semi-Annual Convention, Conrad Hilton Hotel, Chicago, Ill.

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Paper makers have always known that Northeastern Spruce has unexcelled paper making properties. Now, with WONDERWHITE, you have the forming and printing qualities available only in a spruce sulphite, plus the high brightness which only Chlorine Dioxide can give.

Maybe this pulp is the answer to a number of your problems. May we suggest a trial shipment? You'll soon see why we called it WONDERWHITE.

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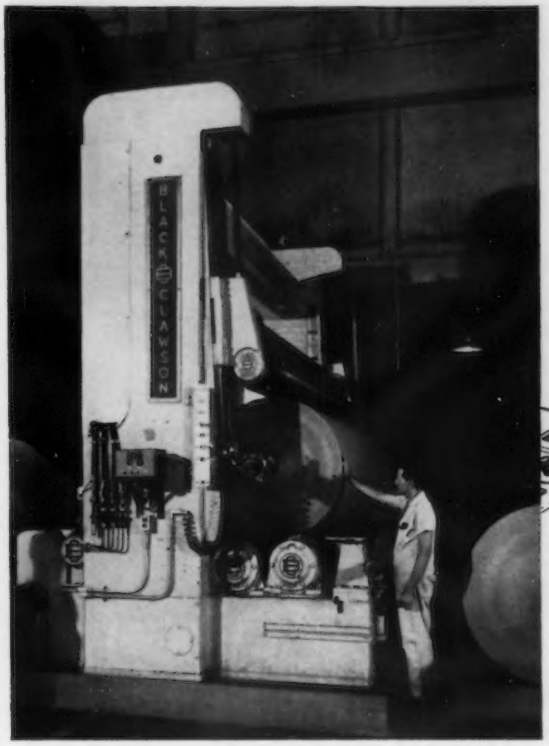
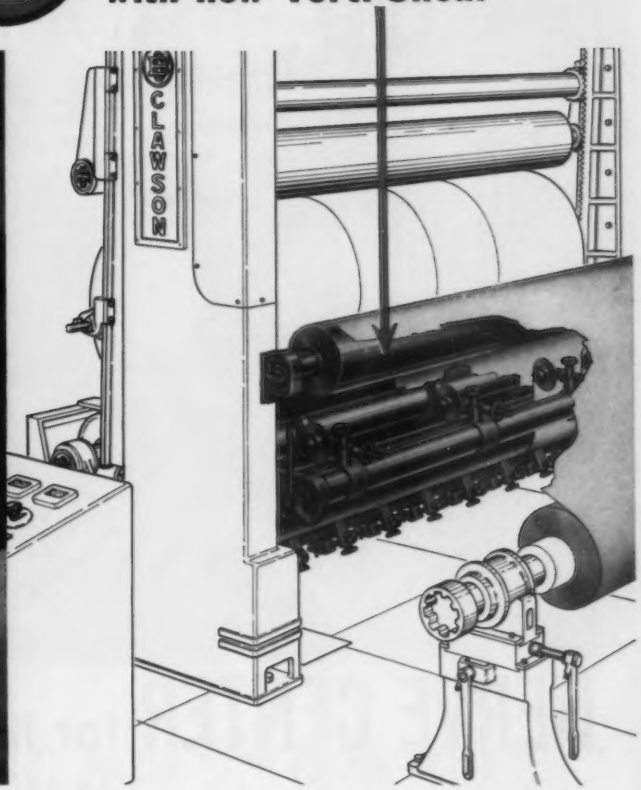
Northeastern Paper Sales, Inc.
400 Madison Avenue, New York 17, N.Y.

Hi-Speed Rollflyte Winders *with new* Verti-Shear*





*Verti-Shear... a new vertical slitting method designed to make Rollflyte winders more productive and easier to operate, has several obvious advantages.

- Shorter draw from point of slit to point of wind
- Slitters and adjustable spreader bar are readily accessible to the operator
- Minimum downtime for maintenance
- Standard commercial parts—bearings, sprockets, air cylinders, etc.

Rollflyte mill winders have heavy box framing that dampens vibration and adds stability. Rotating members are properly sized for minimum deflection and balanced for speeds in excess of operating speeds.

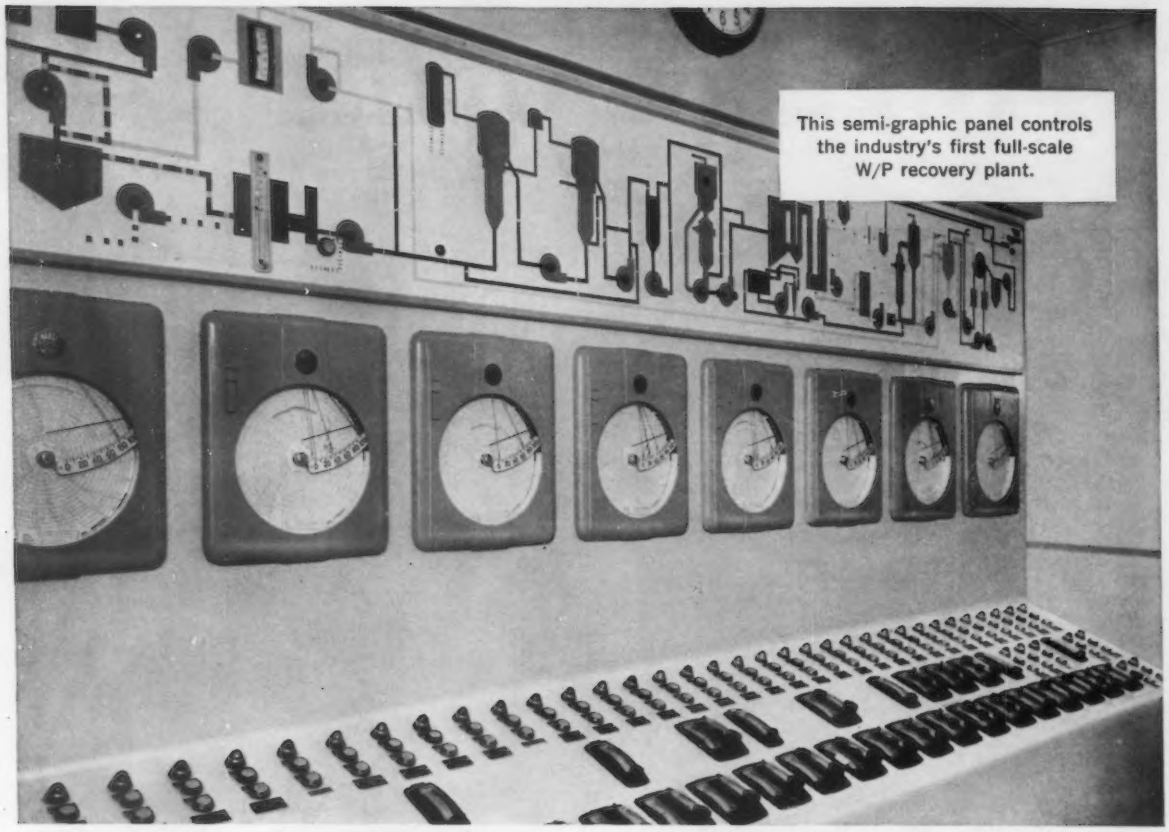
These modern winders can be equipped with roll ejector, air-operated rewind shaft, lowering table, rewind shaft core holder and puller, control console and constant tension control.

Furnished in eight sizes with rewind capacities from 48" to 84" dia., trim width to suit your machine. Write for Bulletin 23-DM

The Black-Clawson Company
Slitter-Winder Dept., Fulton, N. Y.

Another Advanced Engineering Design

BLACK-CLAWSON



This semi-graphic panel controls the industry's first full-scale W/P recovery plant.

NERVE CENTER for first installation of W/P recovery process

This semi-graphic panelboard is regarded as one of the major advances in process instrumentation for the pulp and paper industry.

The reasons:

**A New Process is Involved:*

This panelboard is located at the new recovery plant of Consolidated Water Power & Paper Company, Wisconsin Rapids, Wis. It is the nerve center for the first commercial-scale installation of the Western Precipitation Corporation's new recovery process. Long sought by the industry, the W/P system provides a new approach to processing both acid sulphite and semi-chemical spent liquors.

**Panel Represents Advanced Automation*

The panel is no mere mounting for controls, recorders and control stations . . . it provides an exceptionally advanced degree of intelligence to reduce manpower required in the operation of a highly complicated processing system.

This comprehensive installation is another example of how Bailey is working with pulp and paper processors toward greater degrees of automation, efficiency and quality control.

Put Bailey's 40 years of engineering leadership to work for you. Your Bailey Engineer will be happy to review your plant operation and to suggest applications that will bear immediate return. Check phone book for nearest Bailey District Office, or write direct to our Pulp and Paper Division.

**For further information,* write to the Bailey Meter Company for Reprint No. C-30, "Consolidated Demonstrates Its Recovery of Spent Sulphite Liquors."

P150-1

PULP AND PAPER DIVISION

BAILEY METER COMPANY

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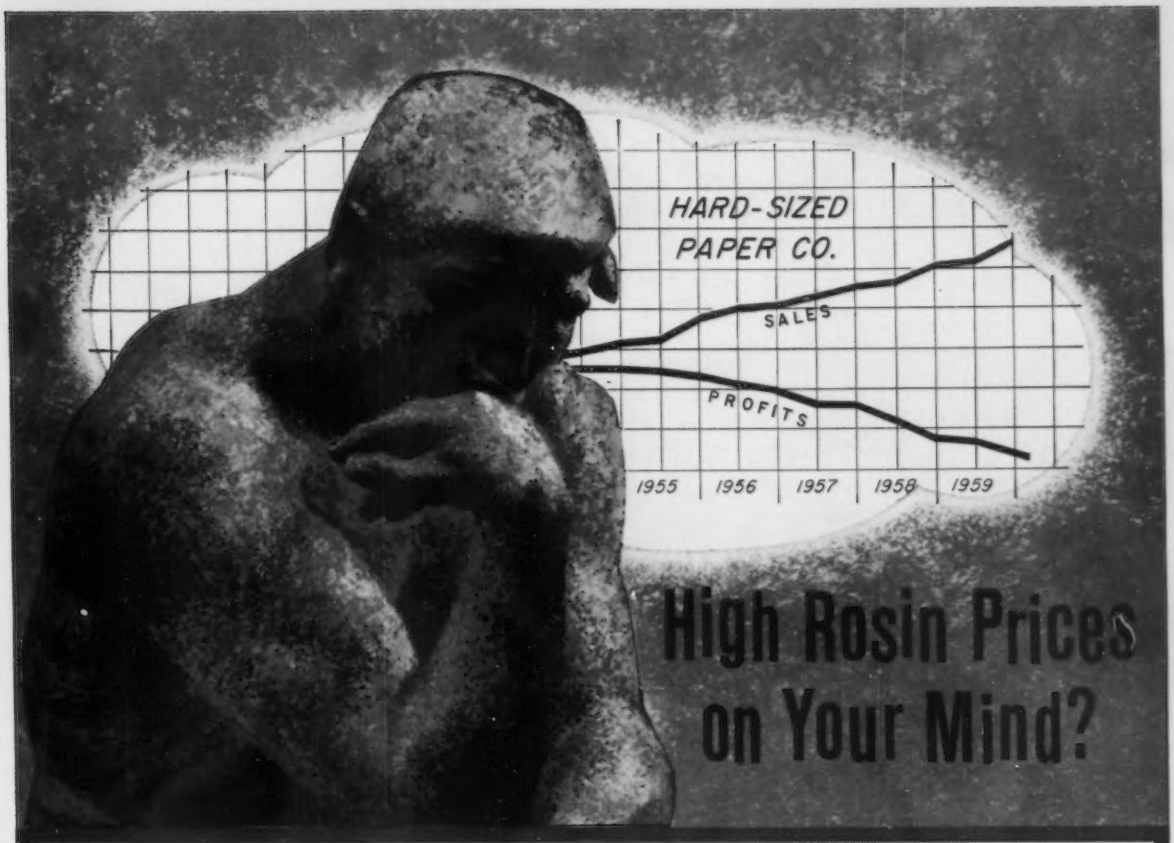
In Canada—Bailey Meter Company Limited, Montreal

BAILEY METERS



RCI WETstrez P-685 Cuts Rosin Size Requirements!

• Now, more than ever, this modified acid-curing urea-formaldehyde resin affords money-saving advantages. *WETstrez P-685 has the unique ability to reduce by ⅓ to ½ the amount of rosin needed in hard-sized paper.*

Yet paper quality is maintained, or even upgraded!

When added to starch at the size press, WETstrez P-685 improves the dimensional stability and increases the wax pick of the sheet. Higher Mullen and tensile strengths are obtained.

This improved technique allows the papermaker to decrease the amount of fortified or rosin size in the beater. This frees the stock, and faster drainage on the wire occurs. A better formed sheet at higher machine speeds is obtained. *And with no unusual broke recovery problem.*

For complete technical data and information on the general technique for incorporating WETstrez P-685 into your paper manufacturing, write Reichhold for *Technical Bulletin P-12.*

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Synthetic Resins • Chemical Colors • Industrial Adhesives • Phenol
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RCI BUILDING, WHITE PLAINS, N.Y.

B.C. Forest Service Photo

PROMISE HIGH QUALITY BLEACHED PAPER PULP IN 1961

Early in 1961, a new high quality market pulp mill will go on stream near Castlegar, British Columbia, at the foot of the Arrow Lakes region of the Columbia River. Celgar Limited will utilize almost 900,000 acres of prime northern-type forest lands held under a Tree Farm Licence in perpetuity.

All the resources necessary for efficient mill operation are available — wood to meet any future demand, plentiful water from the clear Columbia, power and gas, transportation from the mill site to markets, and trained people from established industrial communities in the area.

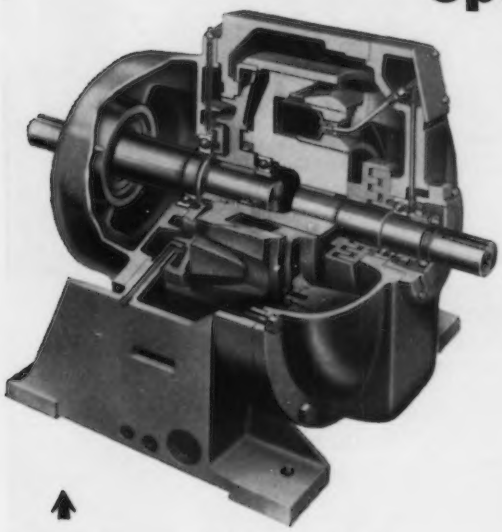
Celgar Kraft will combine many of the best qualities of Northern and Western pulps to produce a product with an exceptional balance of properties. The long, tough fibres from high-density softwoods develop high bursting strengths coupled with outstanding tear resistance over a wide range of freeness, and in a variety of stock preparation equipment.

COLUMBIA PULP SALES LIMITED has been formed to distribute Celgar Kraft pulps and Columbia Cellulose sulphite pulps. Offices are located at:
1030 West Georgia St., Vancouver 5, B.C.
1600 Dorchester St. West, Montreal 25, P.Q.

V4247-1

Celgar Kraft

The BEST Solution to Difficult Speed Control Problems—

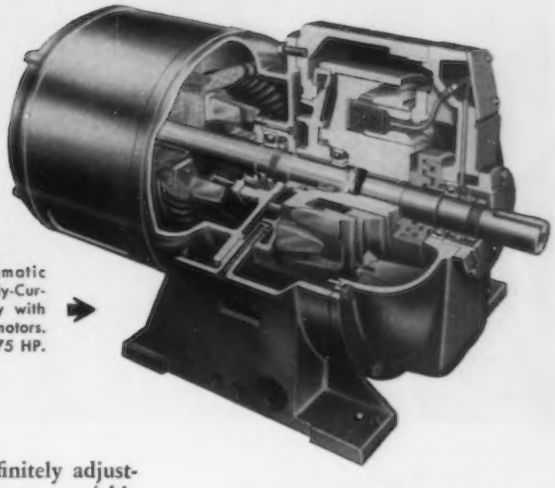


Dynamatic Liquid-Cooled Couplings provide infinitely adjustable speeds for nearly every application from 3 to 75 HP. Note the absence of slip rings, brushes, and commutators. Heavy-duty types with capacities up to 5,000 HP are also available.

EATON

DYNAMATIC®

LIQUID-COOLED EDDY-CURRENT COUPLINGS and DRIVES



"Dynaspede" Drives are Dynamatic Liquid-Cooled, Stationary-Field Eddy-Current Couplings mounted integrally with standard, D-flange, squirrel cage motors. Available in capacities from 3 to 75 HP.

Here's Why—

Dynamatic Liquid-Cooled Couplings and Drives provide infinitely adjustable speed from a constant speed source—or constant speed from a variable speed source. They operate on standard alternating current. Rotary power is transmitted through the coupling by an electromagnetic reaction between the driving and driven members of the unit—there is no mechanical contact of rotating members to cause wear and require adjustment or replacement.

A wide range of standard and special control features may be obtained from a remotely-mounted electronic control system. Infinite speed adjustment, constant speed control, on-off clutch control, torque limit, acceleration control, inching, and threading are a few of the many functions available. The addition of an eddy-current brake to standard couplings or drives provides smooth, cushioned stops and controlled deceleration.

Liquid-Cooled Dynamatic Couplings and Drives deliver more horsepower than other types of the same physical size, thus conserving space in a busy machine area. Efficient heat dissipation permits continued operation at low speeds, or stall with full load.

Completely enclosed, Dynamatic liquid-cooled units are protected from dust, dirt, and other atmospheric impurities. Dynamatic design involves no brushes or slip rings; there is no possibility of arcing. With simple modification these units can be made explosion-resistant for hazardous applications.

Infinitely Adjustable Speeds from AC Power

★

Full-Torque Starts

★

Wide Range of Control Functions

★

No Slip Rings, Brushes or Commutators

★

Completely Enclosed Design

★

Low-Cost Maintenance

Send for Our New Illustrated Bulletin.

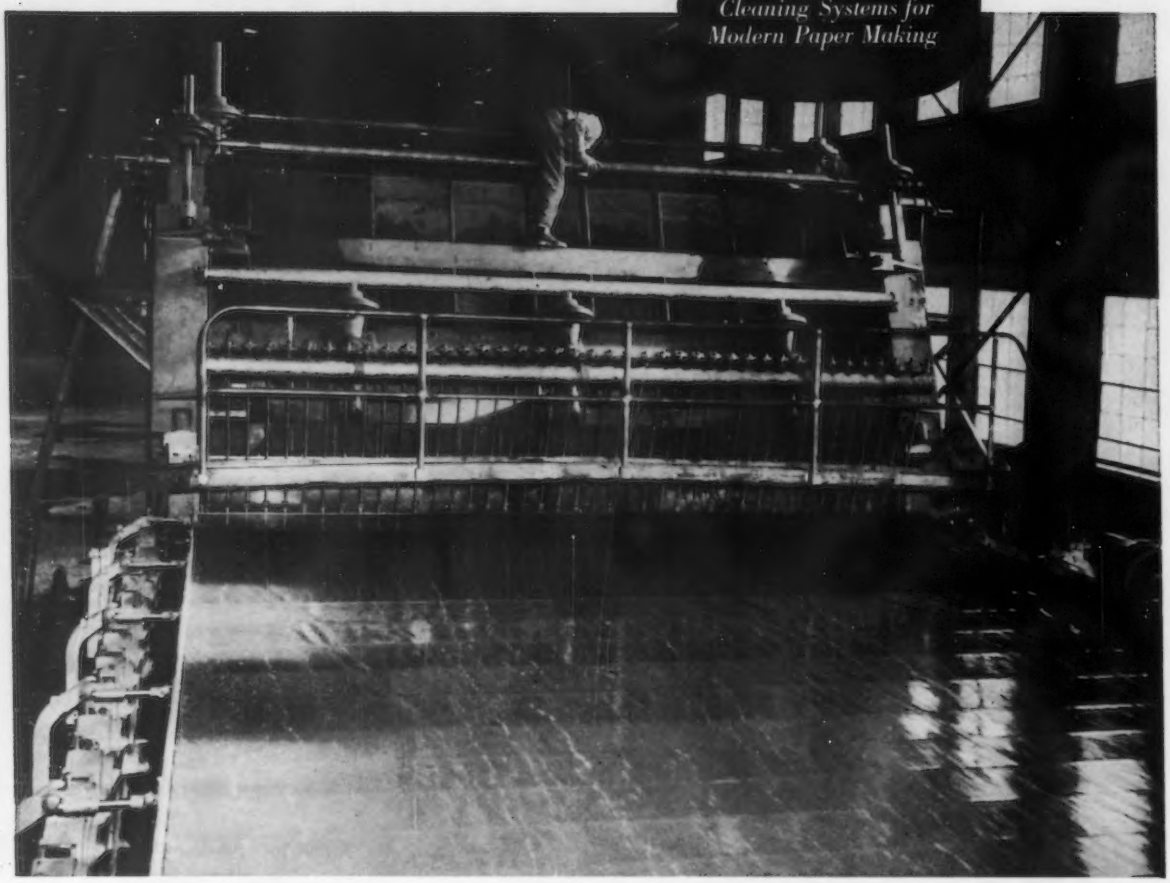
EATON

DYNAMATIC DIVISION

MANUFACTURING COMPANY

3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

Modern Cleaning Systems for Modern Paper Making



Fourdrinier wire life increased 40% by mechanized continuous cleaning

Changing Fourdrinier wires about every 20 days cost one mill over $13,000 yearly.

Mechanizing the wire cleaning and using Oakite Compound 85 made a big difference. Now, the wires average 28 days—a 40% increase in life. Savings: about $5,000 yearly in wire costs alone, *plus* the time and work saved with fewer changeovers.

How it was done. On recommendation of the Oakite man, the mill adopted an in-place cleaning system using Oakite Compound 85. The wire is cleaned without manual brushing. Results: wire is thoroughly cleaned. It's replaced only because it fails mechanically, never because of cleaning damage. In fact, the wire supplier remarked he'd never seen wire returned in such good shape.

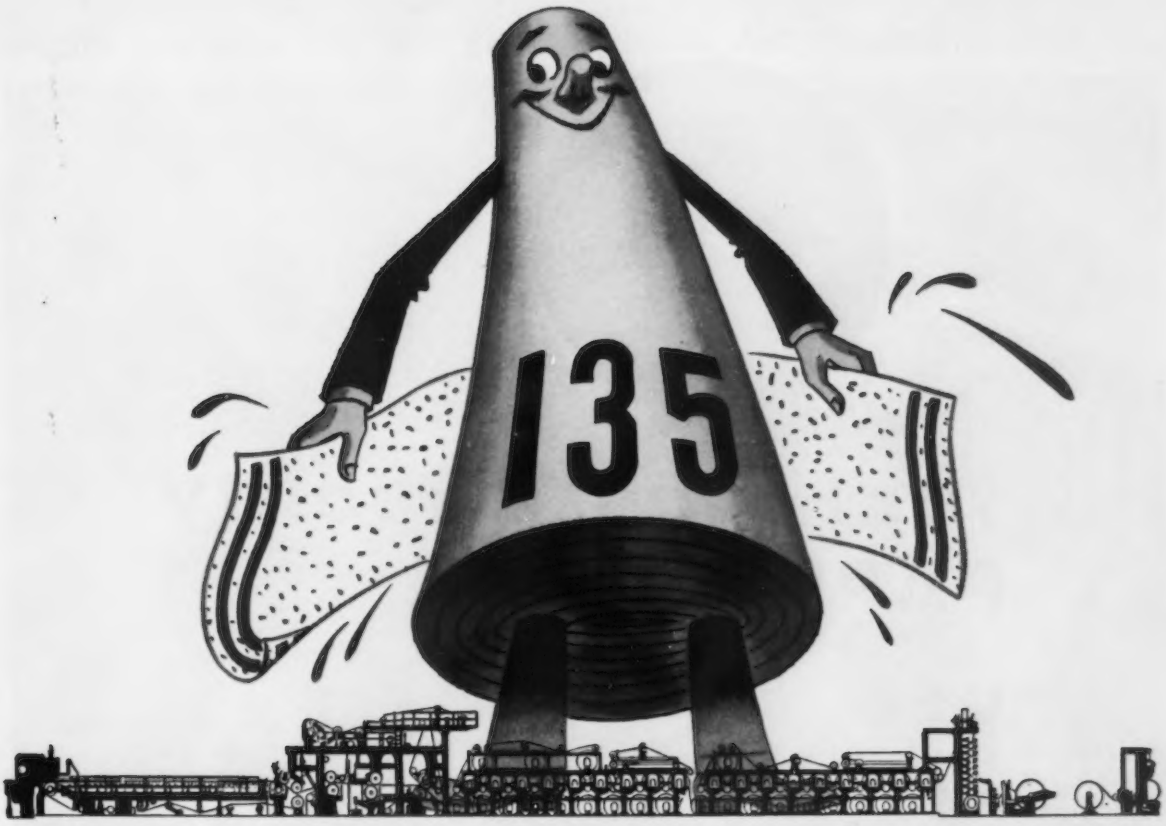
How you can benefit. Ask your Oakite man to help you cut cleaning costs, too. He's well qualified to help you develop time-and-money-saving cleaning *systems.*

Call him in; or write for Bulletin B-4591. Oakite Products, Inc., 68 Rector Street, New York 6, New York.

Technical Service Representatives in Principal Cities of U. S. and Canada
Export Division Cable Address: Oakite

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE
SCIENCE
in our 51st year

Modern Cleaning Systems Keep Downtime DOWN



Planned... For GREATER POROSITY AND LOWER COSTS!

SIAMESE 135

All Cotton Duplex Dryer Felt

SIAMESE 135 is a medium weight, all cotton, duplex dryer felt developed for positions where maximum *porosity* and efficient *drying* are needed, and where initial *cost* is an important consideration! SIAMESE 135 has been recognized as one of the truly superior general purpose felts for over 50 years. From the effective design of its functionally smooth face... to the high quality cotton used in its construction... SIAMESE 135 is engineered to give you longer life, more thorough drying and at substantially greater savings. Available pre-stretched and pre-shrunk with clipper seams.

MOUNT VERNON DRYER FELT FAMILY– SIAMESE 135 is just one of Mount Vernon's full "family" of scientifically designed dryer felts. There's an individual felt for virtually every paper machine position and every paper-making need.

Another Mount Vernon Dryer Felt Success Story...

An important producer of multi-wall kraft paper asked Mount Vernon engineers to recommend a felt for the first top position on their #3 machine. Since this machine produced paper under 40 lbs. of steam pressure, running up to 800 feet per minute, it required a felt with a high degree of porosity to ensure fast, efficient drying. Mount Vernon engineers suggested SIAMESE. Result– runs of 108 and 123 days for SIAMESE versus an average of 95 days for all other cotton felts! SIAMESE cut costs– lasted 10 to 20 per cent longer.

UNIFORMITY Makes The Big Difference In Industrial Fabrics

Mount Vernon Mills, inc.

A LEADER IN INDUSTRIAL TEXTILES

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SELLING AGENTS

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SPECIFY THE SODA ASH THAT SAVES HANDLING AND PROCESSING TIME . . .

Want soda ash that flows more freely, dusts less, dissolves faster?

These are among the working advantages you get in FMC Soda Ash. Made from mined sodium sesquicarbonate, FMC Soda Ash is unique in physical form . . . tiny needle-shaped crystals that roll from hopper cars and flow faster through all handling operations. Dissolve faster, too, to speed processing.

Other extras of FMC Soda Ash include higher chemical purity, lower salts, lower heavy metals and little iron.

These benefits cost you no more . . . another good reason why you should try FMC Soda Ash next time you order.

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Chlor-Alkali Division

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161 E. 42nd STREET, NEW YORK 17

One in a series of interviews with the men who are "Virginia"

"Our new truck service provides one-day delivery of liquid SO_2 – in bulk or ton drums – within a radius of nearly 1000 miles"

Dr. Daniel W. Duncan, vice president in charge of manufacturing at Virginia Smelting Company

Dan Duncan, a vice president of Virginia Smelting Company, discusses the excellent service "Virginia" offers customers who use liquid sulfur dioxide.

Q Does "Virginia" offer unusually prompt delivery of SO_2?

A Yes, within hours by means of our truck service. Railroad cars, either tanks or multiunit ton drum cars, can take a week or more for delivery.

Q In addition to rapid delivery, what other attractive features does your truck service have?

A Our trucks are designed for safety and convenience of unloading. Our drivers handle the unloading of both bulk tanks and ton drums. The special unloader carried on the trailer can quickly unload the ton drums on the customer's platform or lift truck, eliminating the need for a crane or derrick at the customer's plant.

Q What are the advantages of your tank trucks?

A Each tank truck hauls 15 to 18 tons of bulk SO_2. By use of our modern equipment, with sleeper cabs and two drivers, we can take care of a customer's needs on short notice. There is no necessity for interrupting operations and waiting for a railroad tank car.

Q Suppose a customer has an emergency situation in the middle of the night?

A It isn't unusual for us to get orders like this. We consider it an important service to our customers. We have qualified crews on duty 24 hours a day. These men can load and dispatch a truck on very short notice. And I might point out that with our production and storage capacity our customers never have to worry about their SO_2 supply. We can always fill their orders.

"Virginia" liquid sulfur dioxide, of consistently high purity, is available for immediate delivery whenever and wherever needed. Phone, wire or write for prices and any other information desired.

Industrial Division
VIRGINIA SMELTING COMPANY
Dept. 286, West Norfolk, Va.

VIRGINIA® Chemicals

Field Offices: New York • Boston • Chicago • Atlanta
Asheville • Philadelphia • Akron • Seattle • Memphis

Available in Canada and many other countries

A BUFFALO RESIN-BONDED FIBER GLASS FAN MAY BE YOUR ECONOMICAL ANSWER

Excellent chemical resistance to a wide range of acids, salts, gases, organic materials and other corrosives — strength and resilience — ability to stand temperatures up to 300°F. with special resins — and light weight are some of the desirable characteristics of the 'Buffalo' Type FG Fan.

FLANGED INLET AND OUTLET—for gas-tight connections.

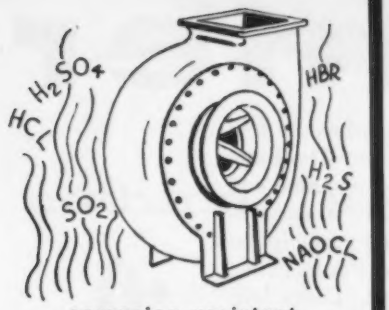
CAPACITIES — up to 34,000 cfm.

PRESSURES — up to 10″ static.

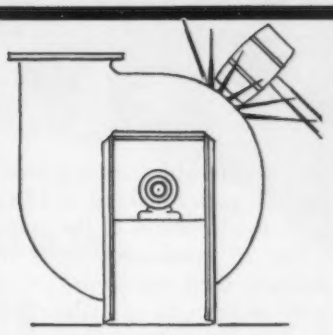
Fan Housing — resin-bonded fiber glass with stainless steel studs moulded-in for mounting to the bearing stand flange. Efficient scroll shape.

Rotor— husky steel wheel completely encased in resin-bonded fiber glass. Factory-balanced, statically and dynamically, for vibrationless performance.

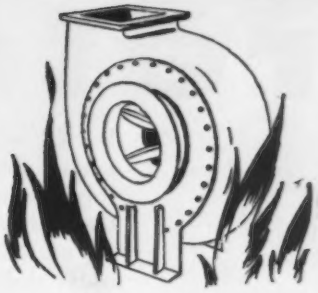
FUME-HANDLING PROBLEM?



corrosion-resistant



impact-resistant



won't support combustion

WRITE FOR BULLETIN FI-511 for all details and chemical resistance table.

"Buffalo"

BUFFALO FORGE COMPANY

Buffalo, New York

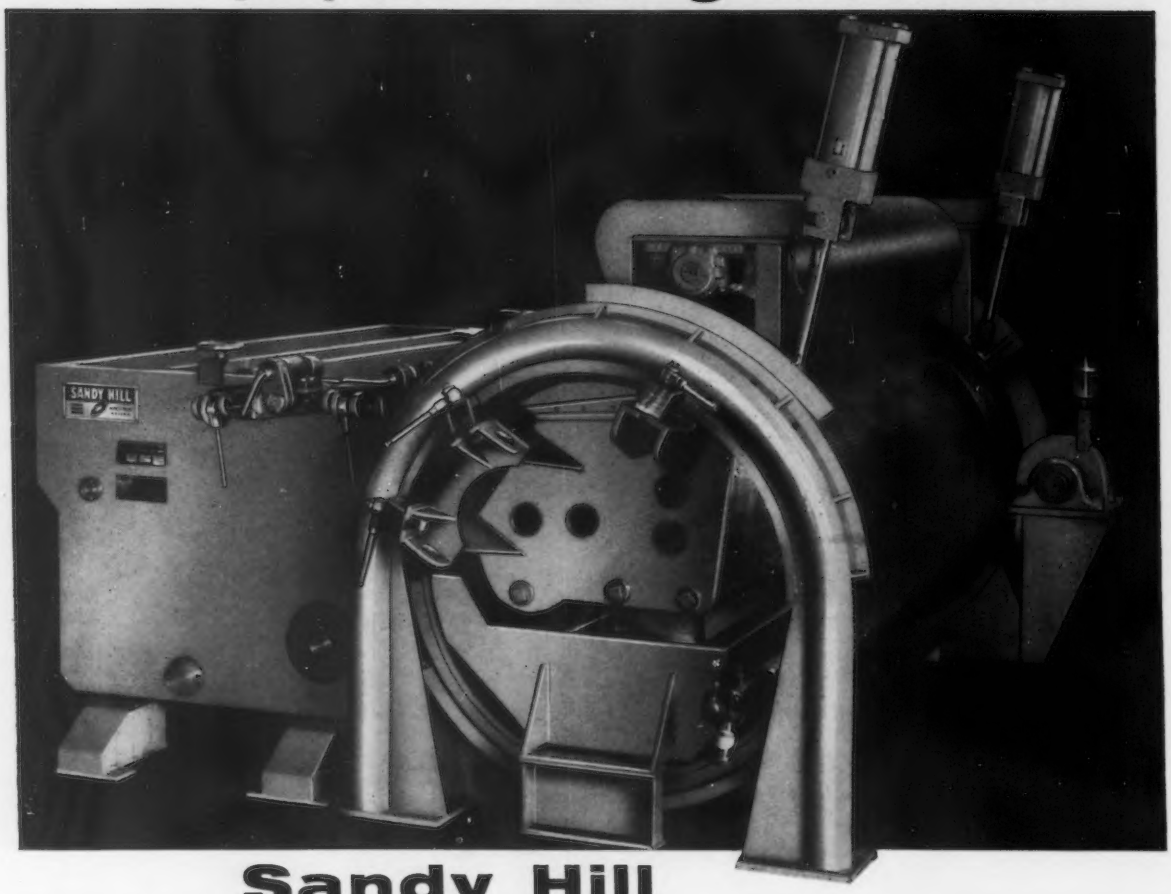
Buffalo air handling equipment to move, heat, cool, dehumidify and clean air and other gases.

Buffalo Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

Buffalo Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

revolutionary new paper making machine



Sandy Hill rotoformer®

Development of this remarkable new machine signifies the first major break-through in paper making in 150 years. The Rotoformer combines the best features of the cylinder machine and the Fourdrinier. The 20 Rotoformer units already in successful use clearly indicate their operational simplicity; their unusual ability to give uniformity of caliper across the machine, and their unique adaptability to special products. Learn how this major achievement from Sandy Hill can fit into your operation.

Call or write us today for your copy of the new Rotoformer Catalog Section.

THE SANDY HILL IRON AND BRASS WORKS
HUDSON FALLS, N. Y.

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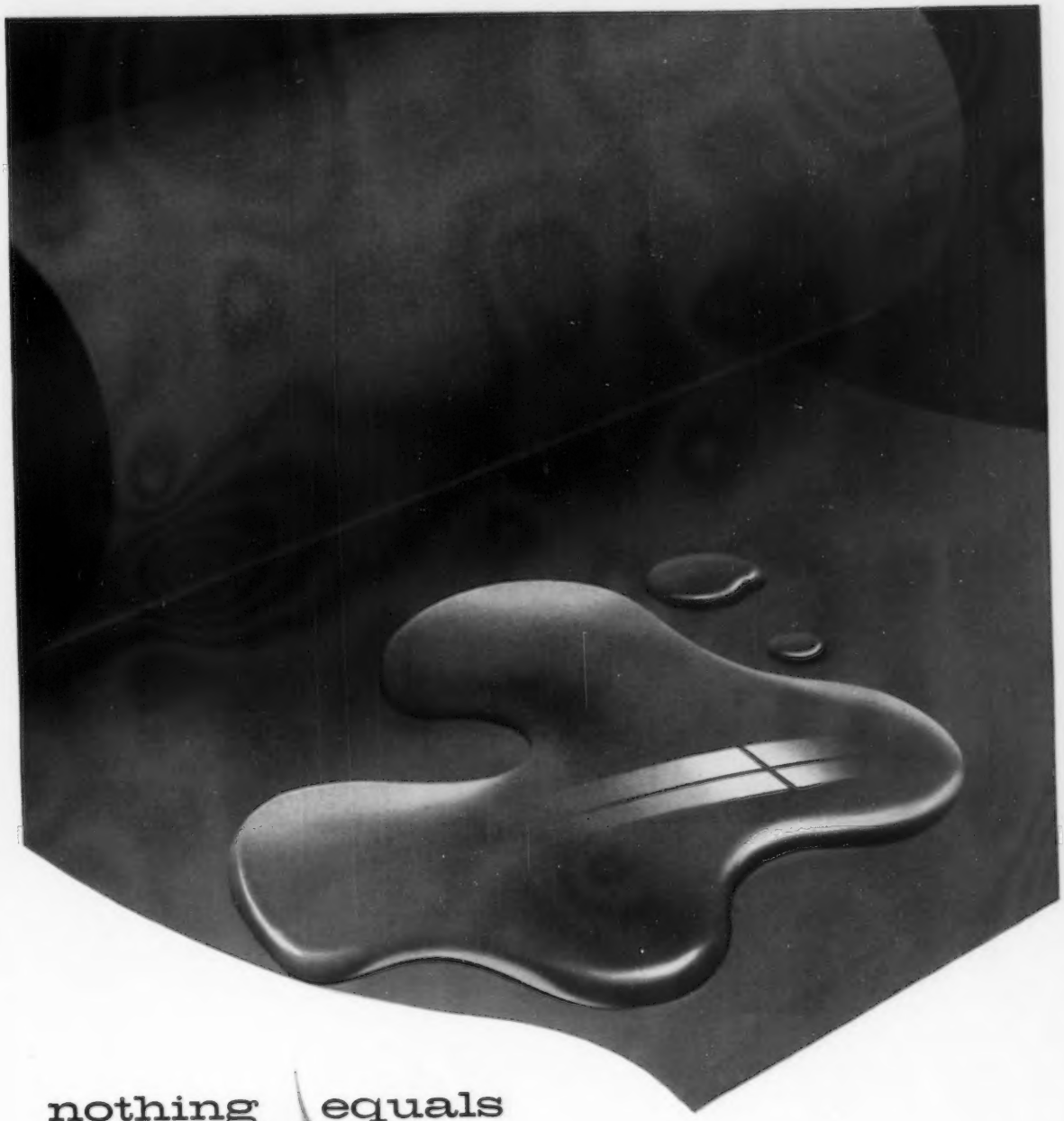
Other patents applied for



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Pale in color and chemically unique, **Piccopale,** a polymerized petroleum resin, is versatile in its many uses. **Piccopale Resin** is inert and heat stable, and its hydrocarbon structure assures the utmost in water and moisture resistance.

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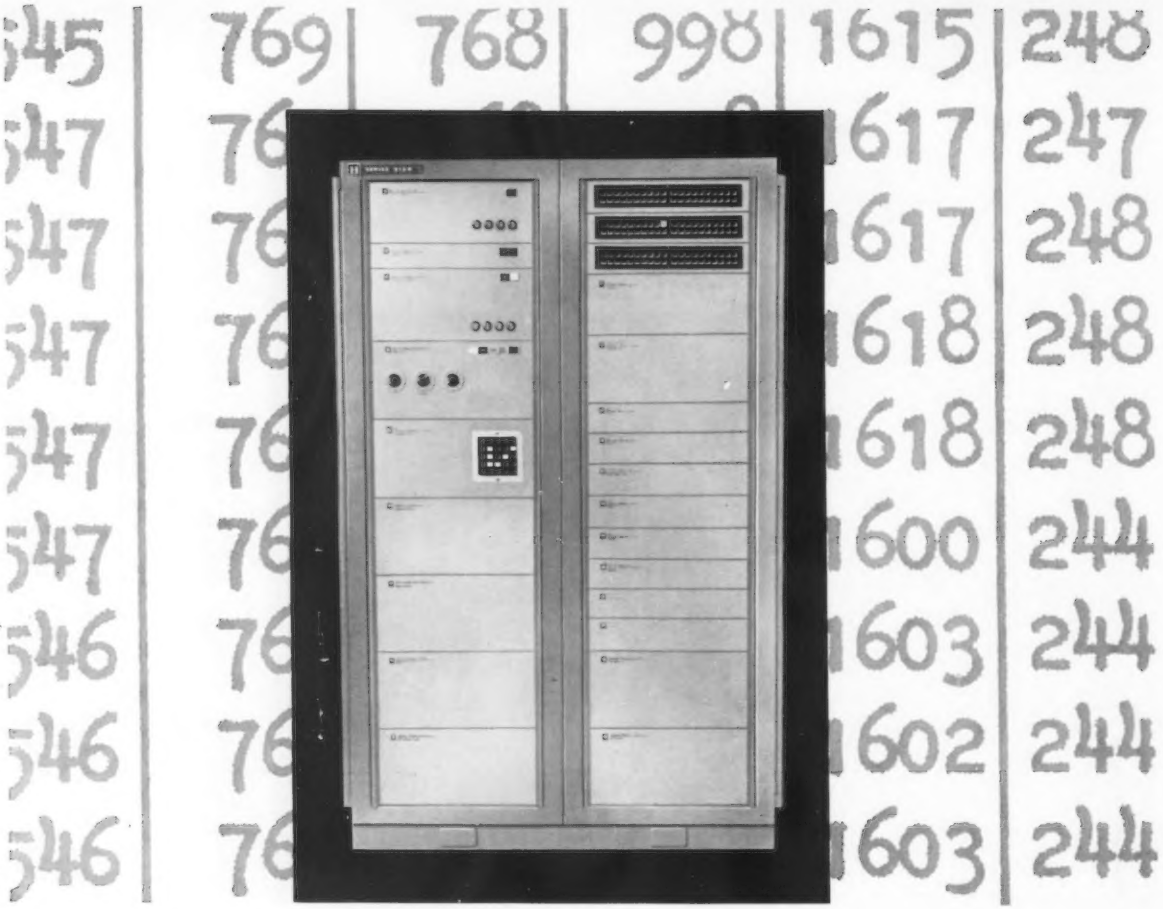

The Series 3120 cubicle occupies less than nine square feet of floor space and normally requires no special air conditioning.

USE THIS ALL-PURPOSE LOGGER-SCANNER AS THE "WATCHDOG" OF YOUR ENTIRE PROCESS

The Honeywell Series 3120 logger-scanner can keep your pulp and paper processes under constant surveillance, give you a wealth of highly accurate, up-to-the-minute, process data, and notify your operators when something goes wrong.

The logger receives electrical signals representing temperature, pressure, flow and other variables from primary sensing devices located throughout the mill. These signals are converted into immediately usable data on a typewritten log sheet. Readings are made directly in terms of degrees, pounds, cubic feet per hour, etc.—no computations are required. The unit can log up to 120 points, with accuracy of $\pm 0.1\%$ of reading.

The scanner monitors seven points per second. When it detects an off-normal point, it sounds an alarm, lights a point-identification light, and prints the time, point number, and off-normal value on a separate alarm record.

With the Honeywell logger-scanner, you get complete process data while it is still meaningful, so that all variables can be easily correlated for best possible process performance. Get complete details from your nearby Honeywell field engineer. Call him today . . . he's as near as your phone.

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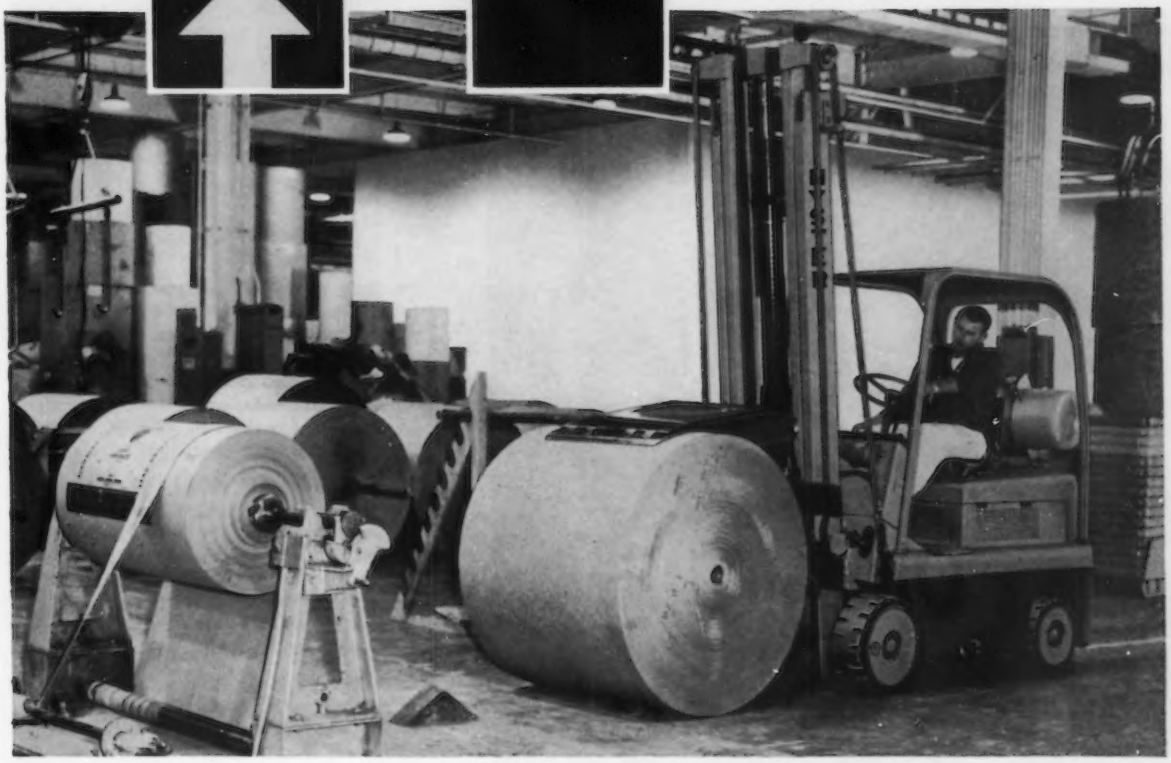

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Hyster lift trucks speed in-process and warehouse handling at Crown Zellerbach Corporation's multiwall bag plant, Antioch, California.

Compact design on cushion tires—power steering standard—ideal for paper plant operations.

Exclusive Monotrol control*—safer, faster, more productive.

Easiest trucks to service and maintain.

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*Optional

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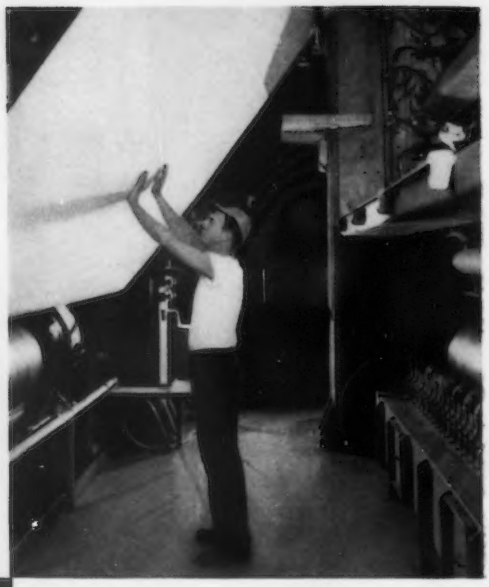
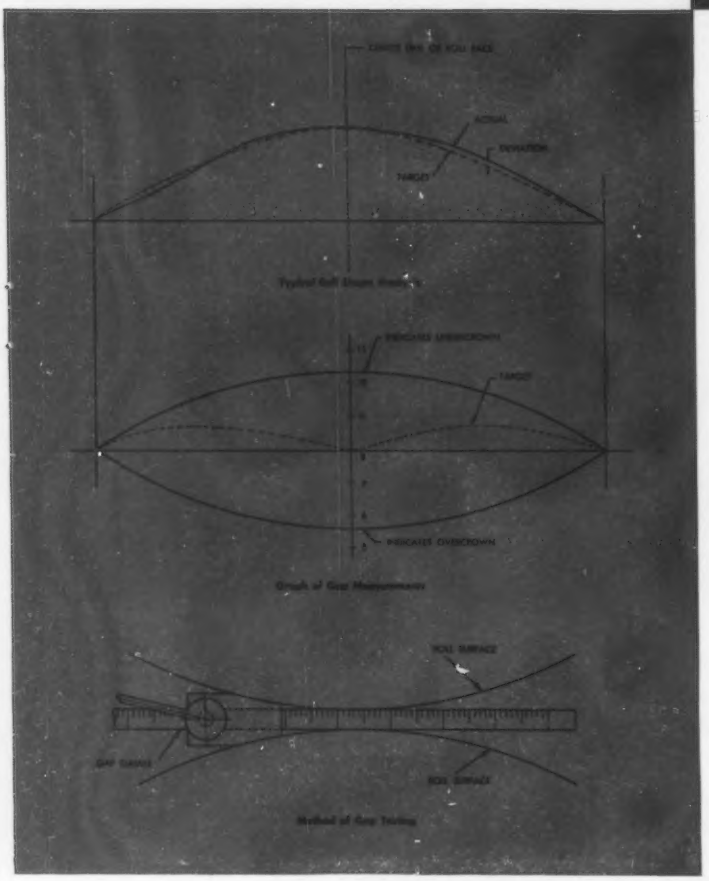
INDUSTRIAL TRUCK DIVISION
P. O. Box 847 • Danville, Illinois

How you can make sure your machine calenders produce high-quality sheet





The only genuinely satisfactory way to produce a good sheet is to crown the machine-calender rolls correctly for operating conditions. Since these conditions vary widely from mill to mill, the crown problem becomes unique for each calender and requires, for the best answer, specialized engineering knowledge as well as extensive experience.

Farrel-Birmingham now offers a crown-analysis service for the solution of this problem. The service is based on a method developed by the company for the calculation of proper roll crowns, and a means of measuring both roll shape and amount of crown for calender stacks.

This method is the result of practical experience gained through close cooperation with engineers in paper mills during a century of roll manufacture.

Correction jobs have been done on existing calenders in mills throughout the country. Results have come up to, or exceeded, expectations. And, in a number of cases, Farrel engineers have been called back to perform a similar service for other calenders in the mill.

Write, wire or telephone the Farrel-Birmingham office nearest you for a preliminary discussion of your requirements.

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Trends

P & B Show 3.5% For Half Year Gain

Paper and board production totalled 17.57 million tons in the first half of this year, according to preliminary estimates compiled by APPA. This is a 3.5% increase over the same period in 1959. Paper production was about 7.9 million tons, up 7%; paperboard at 8.1 million tons was up 2%; and construction paper and board at 1.6 million tons was down 3%.

Pulp Exports Continue Climb

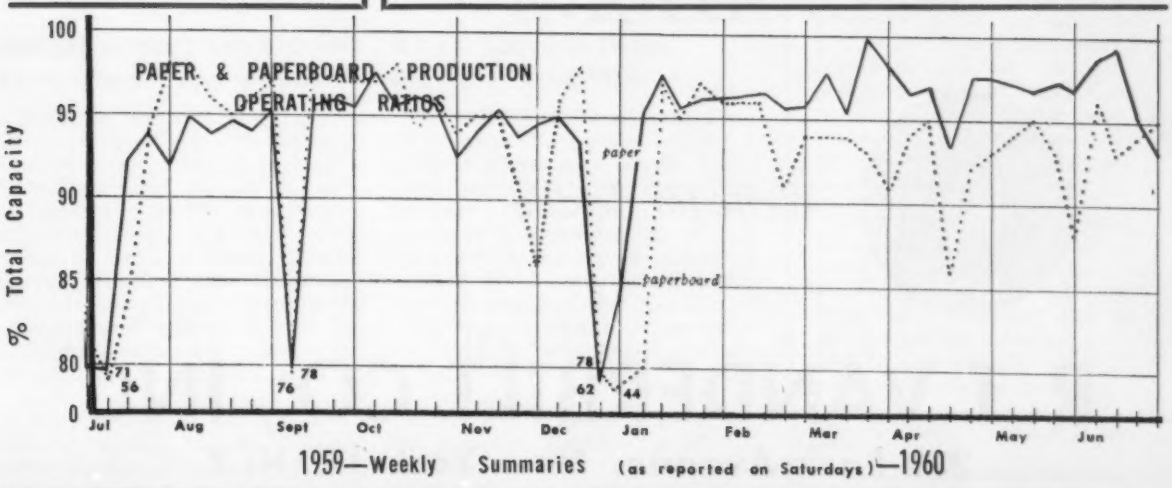
Total woodpulp production in May was 5% ahead of May last year, according to U. S. Pulp Producers Ass'n. For the first five months total output was up 7% compared with the same period in 1959. U. S. shipments of pulp to the domestic market were up 2% compared with last May (2% for the period also). Export shipments of pulp were up 138% for the month (90% for the period).

Papers Up Boards Off

Paper and board production in May at 2,914,269 tons stood 1% above May 1959. Paper production was up 4% for this month, while board production was down 1% compared with the same month last year, according to Bureau of Census figures. Among papers only wrapping and the restricted class "coarse converting" showed any appreciable decline. Folding boxboard and special foodboard were the only members of the paperboard group to outstrip their May 1959 production.

Business Conditions Stable in Chicago Area

The June report of current business conditions made by the Business Survey Committee of the Purchasing Agents Ass'n. of Chicago indicates that conditions in the Chicago Metropolitan area have become stabilized — Prices remain unchanged — Employment and production are steady—Order backlogs for most firms are not shrinking and profit levels seem steady—Inventories are smaller and material deliveries continue on a 60 day or less basis.



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PAPER TRADE JOURNAL

WEEK OF JULY 18, 1960

St. Joe Paper Firm Buys Two More Plants

Purchase of the Columbia Container Corp., Baltimore, Md., and an affiliate, the Container Corp. of Virginia, by St. Joe Paper Co. was announced by Roger L. Main, St. Joe Paper president.

The just announced acquisition brings to 11 the total number of plants now operated by St. Joe Paper. Other operations, in addition to Hartford City, are in Birmingham, Ala.; Memphis, Tenn.; Pittsburgh, Pa.; Port St. Joe, Fla.; Rochester, N. Y. and South Hackensack, N. J.

Groundbreaking Ceremonies for Southwestern Mill Next Month

Ground breaking and dedication ceremonies on August 13 will mark the beginning of construction of the Southwest Forest Industries large pulp and paper mill in Snowflake, Ariz. This will be the first newsprint or kraft mill in a radius of about 1,000 miles from Snowflake, which is located in eastern Arizona.

The plant is to have a capacity of 75,000 tons of newsprint and 65,000 tons of kraft papers per year. Start-up time is for the early part of 1962.

Southern Land Seeking Site Near Blakely

An Early County, Ga., site is being considered for a paper mill along with several other sites along the Chattahoochee River.

John Steedley, chief engineer of Southern Land, Timber and Pulp Co., said drilling operations struck rock at 23 feet and two inches at a proposed site near Blakely, Ga., and a strong formation that would support the machinery was found.

Law Engineering Co. of Atlanta is conducting an evaluation along the river and core borings are being taken.

If the site in Early County is chosen, announcement will be made within three months and construction will begin immediately after the decision is made.

Marathon Northern Latest Stream Improvement Efforts

Marathon has completed a million dollar's worth of new installations to improve water conditions in the Fox River, East River, and Green Bay.

Marathon's Northern mill now is processing all of its effluent before release to the Fox River. This includes withholding from the stream all spent sulphite liquor that can be collected and making it into by-products. Also they are no longer discharging anything in the East River.

Most recent additions are a spray dryer for sulphite liquor and an elaborate system of settling basins before discharge to the Fox River.

Allied Acquires Texas Business Forms Firm

Acquisition of the Carmax Corp. of Houston, Tex., manufacturer of business forms as a wholly owned subsidiary of the Allied Paper Corp. has been announced.

Arnold H. Maremont, chairman of the board, in making the announcement at Allied headquarters in Chicago, advised that this was part of his company's plan of expansion in the business forms field. Last April, Allied acquired the Egry Register Co. of Dayton, Ohio, the Stephen Greene Co. of Philadelphia, Pa., and the American Register Co. of Boston, Mass.

New Weyerhaeuser Machine Planned for Longview

Weyerhaeuser Co. plans to install a new 120-inch specialty paperboard machine at its Longview, Wash., mill. At this time the machine is in the process of being engineered. According to a tentative schedule the machine will be installed and ready to operate sometime during December 1961. The machine will produce cup stock, lightweight food wrap and milk bottle board.

Paper Mill at Mobridge Under Consideration

The possibility of constructing a straw pulp paper mill on the Missouri River near Mobridge, S. D., is being explored.

Present at a recent meeting to discuss the paper mill were members of the Industrial Development Committee of the Standing Rock Sioux Tribe, and directors of the Mobridge Development Corp.

Paper and Paper Board Production

The American Paper and Pulp Association reported the ratio of the United States paper production to mill capacity for the week ending July 2, 1960, at 88.4 per cent compared with 96.5 per cent revised, for the preceding week. The ratio was 71.7 per cent for the corresponding week a year ago.

The National Paperboard Association reported the paperboard production ratio for the week ending July 2, 1960, at 90 per cent, compared with 94 per cent for the preceding week and 82 per cent for the corresponding week a year ago.

(Detailed Statistics on page 65)

Sandwell Engaged for Laborador Survey

Sandwell and Co. of Vancouver, B. C., has been engaged to carry out engineering surveys in Labrador with a view to building a pulp and paper mill.

Financier John Shaheen is seeking exclusive three-year rights to explore Labrador's rich forests with a view to establishing Newfoundland's third pulp and paper mill, if surveys prove worth while.

He explained the proposed deal in the second reading of a bill which would turn over the Labrador concessions to the newly founded Newfoundland Pulp and Chemical Co., headed by Mr. Shaheen.

Colombia Paper Plant To Use Finnish Pulp

A new paper plant being built at Pereira, in the Department of Caldas, Colombia, will use Finnish wood pulp to be supplied in exchange for Colombian coffee, the Foreign Agricultural Service reports.

Canada Fine Paper Output Continues Upward Growth

Canadian fine paper production and shipments continued their steady upward growth in May.

Output for the month was 25,215 tons, up from the 23,864 tons produced in the same month last year. In the first five months production was 122,850 tons as against 117,237 tons last year.

Shipments during May were 25,708 tons as compared with 23,061 tons last year. Included in the total were exports of 2,036 tons, as against 1,364 tons in May 1959. Fine paper shipments in the first five months were 124,452 tons as against 114,694 tons in the same period last year.

Coated paper output to the end of May was 14,757 tons and shipments were 14,521 tons. In the first five months last year, production was 14,016 tons and shipments were 13,540 tons.

Another Paper Mill For Colombia

Pulpacel will build a paper mill in Carare, Colombia Department of Santander, to be financed by Carton de Colombia, Container Corp. of America, and Instituto de Fomento to the extent of 25 million pesos ($3.7 million) plus a $6.5-million proposed loan.

PAPER PEOPLE

J. R. Heffner

B. A. Sanson

Engineers Join KVP Sutherland

KVP Sutherland Paper Co., Kalamazoo, Mich., announced two new laboratory appointments within the Technical Department of the KVP Division.

James R. Heffner, 1960 graduate of Tri-State College, Angola, Ind., with a B. S. degree in chemical engineering, was appointed a process engineer.

Bruce A. Sanson, a 1960 graduate of Michigan State University, East Lansing, with a B. S. degree in packaging engineering, was appointed a packaging engineer.

Also announced was the appointment of Harlan Longnecker as sales manager of the company's Specialties Division. Mr. Longnecker joined the company in 1937 and has served in the sales area of the company since that time. He succeeds George Gard, who resigned June 15.

Celotex Appoints La. Division Manager

William M. Lehmkuhl, works manager of the Celotex Corp. plant, Marrero, La., has been appointed manager of the corporation's Louisiana Division. Replacing Mr. Lehmkuhl as Marrero works manager is Jerry L. Dickson, manager of the insulation board plant's engineering department.

In his new position Mr. Lehmkuhl will devote his time to long range planning for the Marrero operation and to the development of other Celotex interests in Louisiana. He will continue to be in charge of Marrero operations. A graduate chemical engineer. Mr. Lehmkuhl has had 30 years experience in the building materials field.

Mr. Dickson graduated from Louisiana State University in 1939 with a chemical engineering degree. He was with Flintkote in New Orleans and Kaiser Aluminum and Chemical Co. in Gramercy before joining the Celotex Marrero plant.

Hammermill Announces Marketing Staff Changes

Several important changes in the marketing organization serving divisional and subsidiary manufacturing operations have been announced by John E. Franzen, vice president, marketing, Hammermill Paper Co.

Harold B. Wilson, formerly divisional manager of advertising and sales promotion, has been appointed director of advertising and sales promotion. In this newly created position, he will have the responsibility of co-ordinating and programing the advertising and promotional effort in support of paper sales.

John Studney, formerly divisional sales manager for industrial papers, has been appointed director —marketing development, a newly created position.

Richard A. Reeves, formerly product manager—printing papers, has been appointed divisional sales manager — Hammermill Papers,

manufactured at Erie and Oswego, N. Y., divisions of the company.

Robert D. DeVitt, formerly district sales manager—Southeastern territory, has been appointed divisional product manager—Hammermill printing papers, also manufactured at Erie and Oswego.

Robert J. Schweitzer, formerly assistant district sales manager—Midwestern territory, replaces Mr. DeVitt as district sales manager—Southeastern territory.

Dieterichs To Fill Post At Rex Paper

The Rex Paper Co. of Kalamazoo has appointed Walter H. Dieterichs of Dixsfield, Me., as assistant general superintendent of the company.

Mr. Dieterichs comes to Rex from the Oxford Paper Co. in Rumford, Me., where he was chief chemist. He holds a bachelor of science degree in chemical engineering from Washington University in St. Louis, Mo., and has done graduate work in psychology and metallurgy.

Westvaco Assigns Wright to New Post

P. Wilson Wright of the West Virginia Pulp and Paper Co. Charleston, S. C., plant, has been transferred to the company's tall oil department. He was formerly operations superintendent.

Hammermill Oswego Plant Has New Manager

The appointment of Victor S. Oakes as division manager of the Oswego Division of Hammermill Paper Co. at Oswego, N. Y., has been announced by vice president and manager of mills F. E. Bahrenburg.

In his new position, Mr. Oakes will be responsible for management of the entire Oswego division when Hammermill takes possession of the property late this fall.

ASTM Elects Willets To Board of Directors

William R. Willets, assistant manager of the Titanium Pigment Corp.'s Technical Service Laboratories, 99 Hudson Street, New York 13, N. Y., was elected to the board of directors of the American Society for Testing Materials at the Society's annual meeting in Atlantic City June 27—July 1. Mr. Willets has been with the Titanium Pigment Corp. (a wholly owned subsidiary of the National Lead Co.) for over 27 years.

W. R. Adams

St. Regis President Heads Project Hope Committee

W. R. Adams, president, St. Regis Paper Co., has accepted the chairmanship of the Paper Products Industry Committee of Project HOPE. Announcement of the appointment came from Ernest R. Breech, board chairman of Ford Motor Co. and chairman of the HOPE Business and Industry Committee. Mr. Adams will head an industry-wide drive to raise funds for Project HOPE.

"By supporting an effort such as HOPE, Mr. Adams said, "American business and industry can take part in a tangible demonstration of the deep concern of Americans for the plight of millions in other lands. In ways such as this America can most effectively wage peace."

Longview Announces Sales Management Changes

Longview Fibre Co., has announced that R. E. Wertheimer, assistant manager of container operations for the firm, is being transferred from Longview, Wash., to San Francisco, Calif., as an additional assistant manager of container sales. The move, which is effective September 1, is being made to make possible increased sales management effort in the container field. F. H. Clewley will continue in a similar capacity under P. M. Wineman, manager of container sales. The position currently being filled by Mr. Wertheimer is being discontinued.

The company operates container plants at Longview and Seattle, Wash., Oakland and Los Angeles, Calif., and a wholly owned subsidiary, General Fibre Box of Springfield, Mass. Earlier this year Longview Fibre Co. also acquired Downing Box Co. which operates container plants in Milwaukee, Wis., and Cedar Rapids, Iowa.

Boger Joins Fiber Products Research

George G. Boger, Jr., has joined the staff of Fiber Products Research Center, Inc., as manager of engineering economics.

Mr. Boger was formerly technical director of Amalgamated Chemical Corp. in Philadelphia and previous to that was with Paper Products Mfg. Co., Swarthmore, Pa. He also worked as a chemist for Hamilton Paper Co. in Miquon, Pa.

"I think I'll go, it may help my acid stomach."

Head table at Banquet. Seated: Chairman Andrew Chase, University of Maine; James W. Field, TAPPI; George Olmstead, Jr., president, S. D. Warren Co., banquet speaker; Philip E. Nethercut, secretary-treasurer, TAPPI; Chairman-elect Edward N. Poor of Hudson Pulp and Paper Co. Standing: Robert E. Perry, Scott Paper Co.; Donald Bail, Great Northern Paper Co.; Secretary-Treasurer Harold E. Pratt, Pejepscot Paper Co.

Maine – NH TAPPI Holds Successful Meeting

The annual spring meeting of the Maine-New Hampshire Section of TAPPI was held on June 17-18 at Mountain View Inn, Whitefield, N. H. The technical program concentrated on the presentation of eight papers on stock refining, industrial engineering and material handling. The Friday morning program consisted of a tour of the mill of Brown Co. in nearby Berlin, N. H. George Olmstead, Jr., president, S. D. Warren Co., was the principal speaker at the banquet held on Friday evening. Edward N. Poor, Hudson Pulp & Paper Co., was elected chairman to succeed Andrew Chase of the University of Maine.

Technical papers were presented as follows:

Refining.

"The Response of Chemically Pulped Wood Fiber to Mechanical Treatment"—E. F. Thode, Institute of Paper Chemistry.

"Disk Refining"—J. B. Scott, E. D. Jones Co.

"Comparison of Valley Beaters, Ball Mill and Mill Jordan"—B. K. Moyer, Oxford Paper Co.

"Process Instrumentation Applied to Refining"—R. F. Barber, Foxboro Co.

Industrial Engineering & Material Handling.

"Economics of Wet Lap Pulp Baling—M. C. White, Oxford Paper Co.

"Something of Interest on Paper Finishing" A. R. Perrin, Jr., S. D. Warren Co.

Panel Discussion, Industrial Engineering & Material Handling.

Panel members at Saturday morning panel discussion. Left to right: R. F. Barber, Foxboro Co.; J. B. Scott, E. D. Jones Co.; E. F. Thode, Institute of Paper Chemistry; John Lewis, Pulp & Paper Research Center, Inc., moderator.

"Parent Size Sheet Packaging"—T. C. Warren, International Paper Co.

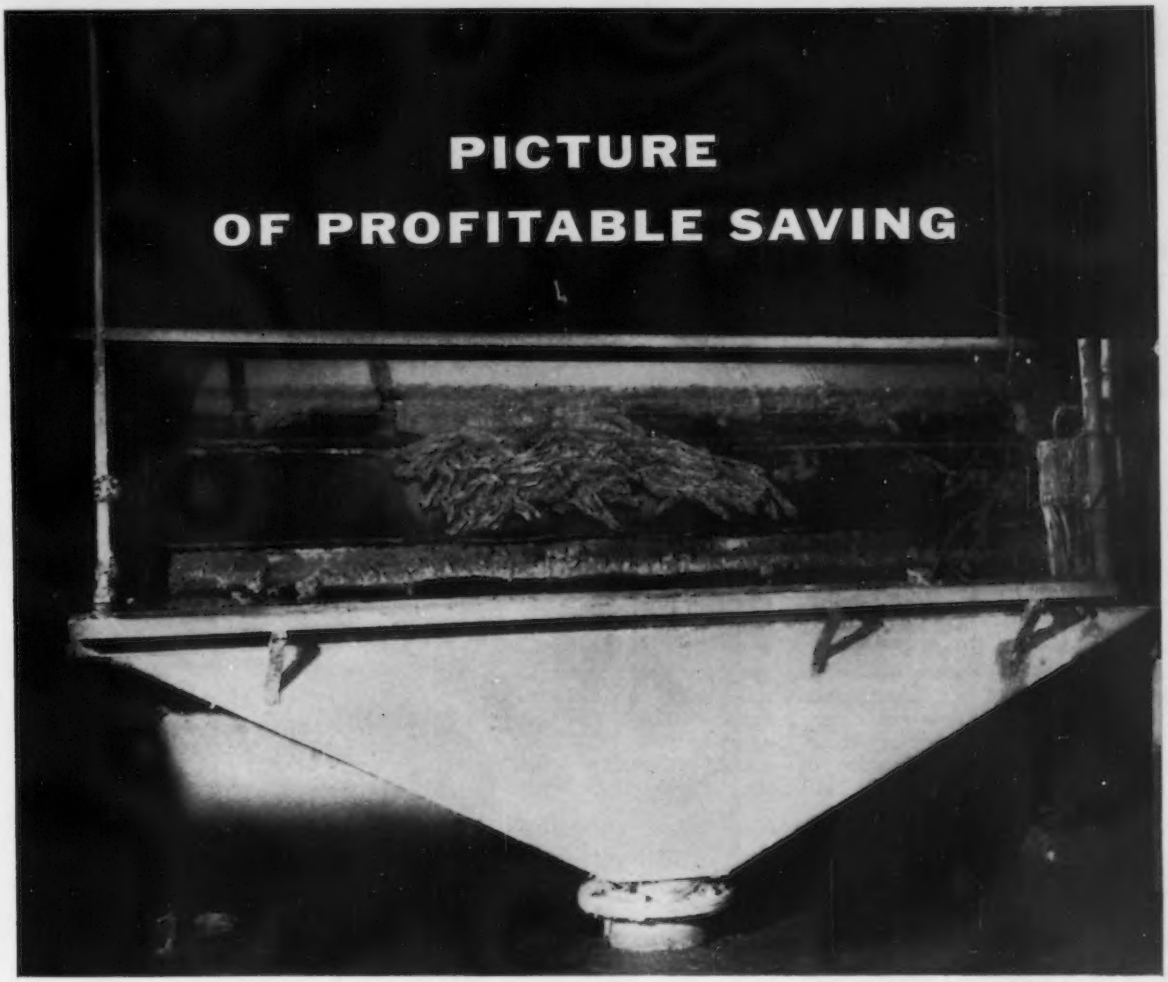
"The Economics of Unloading Railroad Car Shipments of Pulpwood"—H. N. Bartley, Great Northern Paper Co.

Some of the more interesting of the above papers will be published in early issues of PAPER TRADE JOURNAL.

Some aspects of the social program included dancing, a picnic, golf, trap shooting and bingo.

Philip E. Nethercut, (right) Secretary-Treasurer of TAPPI presents certificate to outgoing Section Chairman Andrew Chase as J. W. Field (left) of TAPPI looks on.

Retiring Chairman Chase hands over the gavel to newly elected chairman, Edward N. Poor of Hudson Pulp and Paper Co., while Secretary-Treasurer Harold Pratt, watches.



The stock you see coming off the couch roll of this Bird Save-All is going right back into the machine chest to be made into good, salable paper.

Judge for yourself how soon this Save-All will pay for itself.

The reason why so many mills prefer Bird Save-Alls is that they are designed, constructed, installed and operated to recover fibre from white water at the very lowest net cost per ton.

Ask us to figure the net return in your case.

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NEWS OF CONVERTERS

Fibre Drum Ass'n. To Dissolve

At a special meeting of the Fibre Drum Manufacturers Ass'n. in New York on June 22, it was voted to dissolve the association.

This action to terminate the association, notwithstanding the continued growth of the fibre drum industry in volume and number of plants, was based on inadequate participation and representation.

H. M. Walter, Continental Can Co., Inc., New York, N. Y., has served as president of the association during the last two years; W. D. Cox, Sr., Fibre Drum Co., Chicago and Kankakee, Ill., has been vice president; Christopher Binaris, Plyfiber Container Corp., Elizabeth, N. J., is secretary-treasurer; Glenn Mather who aided in the initial steps from 1943 to 1946 which lead to the organization of the association has served as managing director.

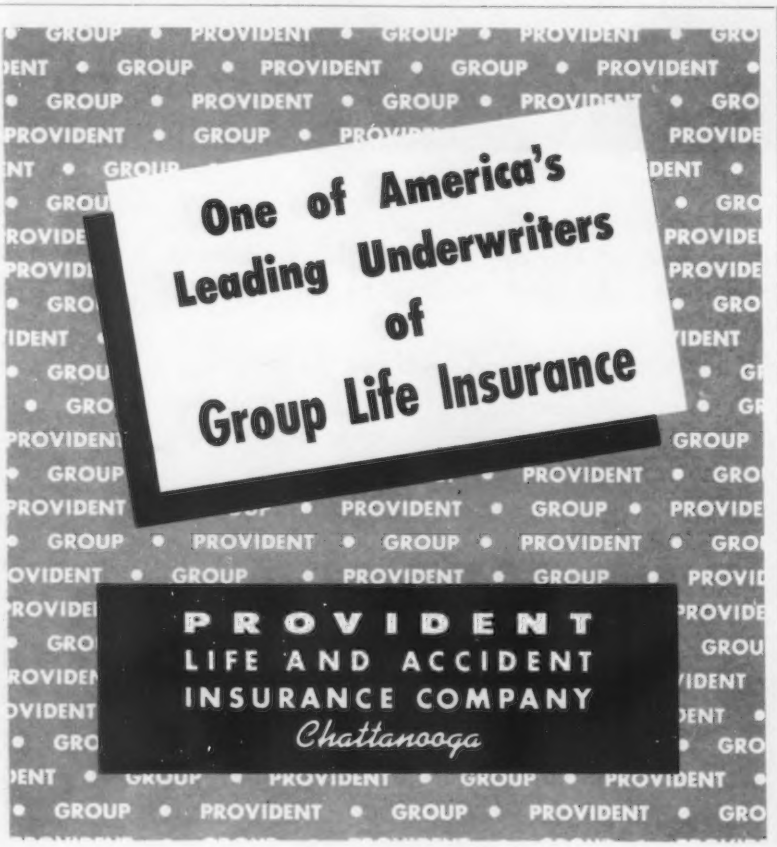
The actual termination date has not been set, but is expected to be within a few weeks.

Dixie Cup Plant To Be Expanded

A construction program that will result in a 50 per cent expansion of the Lexington, Ky., plant of the Dixie Cup Division of American Can Co. has been announced. Announcement of the expansion, which will add 130,000 square feet of space to the local manufacturing unit, was made by C. L. Van Schaick, Dixie Cup general manager in Easton, Pa. The present plant consists of about 262,000 square feet. With the addition, it will total almost 400,000 feet.

The new construction, expected to be completed in October, will cost almost $1,000,000. The builder is Daniel Construction Co., Atlanta. The new addition will be a masonry and steel construction.

The Lexington plant of Dixie Cup was opened in 1958. Its products are distributed throughout the middle west.



W. W. Brown

O-I Paper Products Div. Chooses General Manager

William W. Brown has been named general manager of the Owens-Illinois Paper Products Division's Milwaukee plant.

Mr. Brown, who has been assistant regional sales manager of the division's north central region with headquarters in Chicago, will be responsible for sales, administrative and production activities at the Milwaukee plant.

FPBA Elects Ruble Exec. Committee Member

Charles Ruble, Sr., president of Standard Paper Box Corp., Los Angeles, has been elected a member of the executive committee of the Folding Paper Box Ass'n. of America.

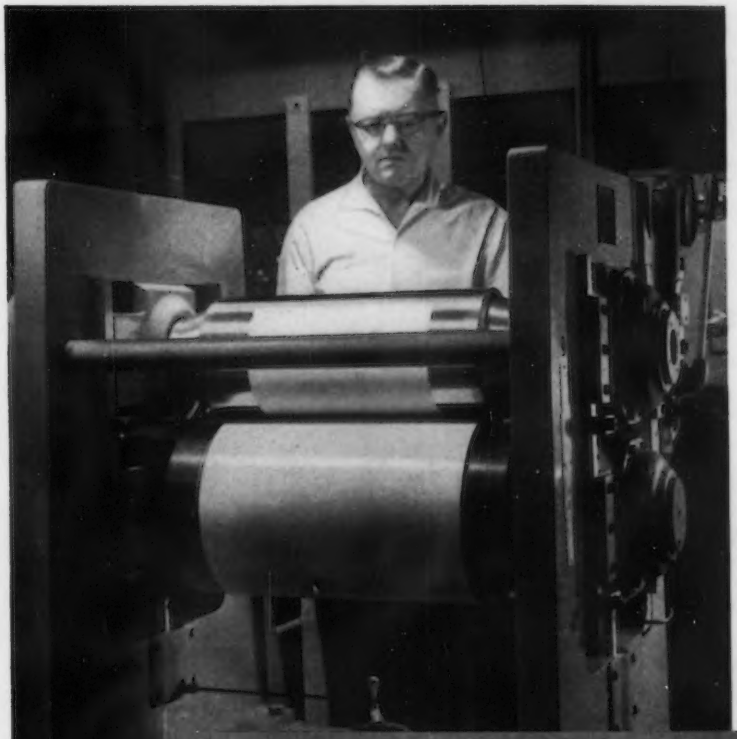
A boxmaker for more than half a century and a member of the association almost from its beginning, Mr. Ruble fills a vacancy on the executive committee created recently by the resignation of Ralph Schnitzer, Houston, Tex.

New Paper Bag Firm Organized in Kalamazoo

One of the newest and one of the oldest names in the Kalamazoo Valley paper converting industry have been linked in the incorporation of the Stewart Sutherland Bag Co.

Managing officers will be Robert

From the Paper Research Laboratory of The New Jersey Zinc Company
ONE *of a Series of Test Procedures on Horse Head Titanium Dioxide*



Supercalendering is one of the important steps in the preparation of test samples for use in the study of characteristics of coated paper.

SUPERCALENDERING

Characteristics of coated papers—uniformity and smoothness of surface, gloss, opacity, printability, and show-through are studied continuously in the paper laboratory of The New Jersey Zinc Company. An important phase of the program involves a study of the effect of supercalendering on such properties of coated papers pigmented with various types of titanium dioxide.

These investigations have developed and will continue to develop new and practical information on the application of titanium dioxide in coated papers. Too, they are providing a constant check on the basic properties of Horse Head titanium dioxide to assure the highest standards of pigment quality and uniformity.

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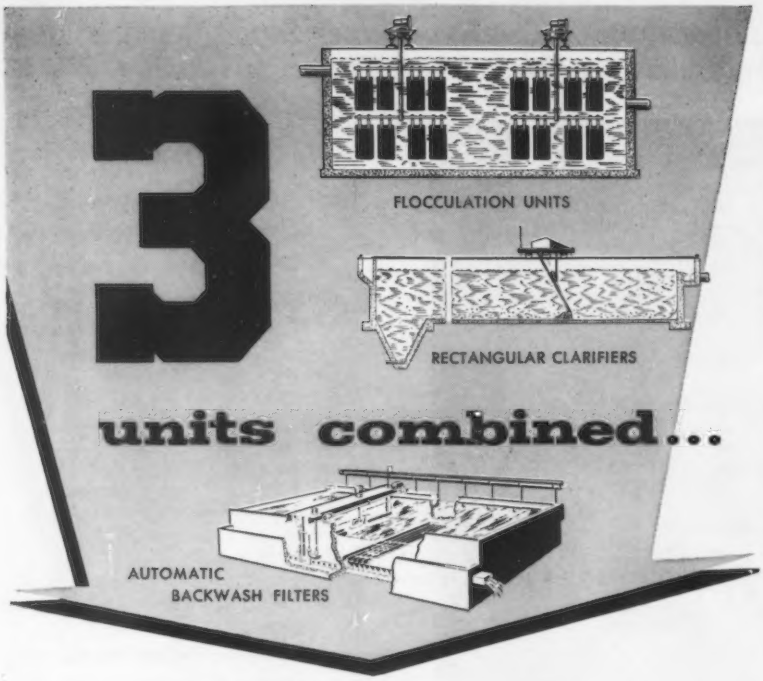

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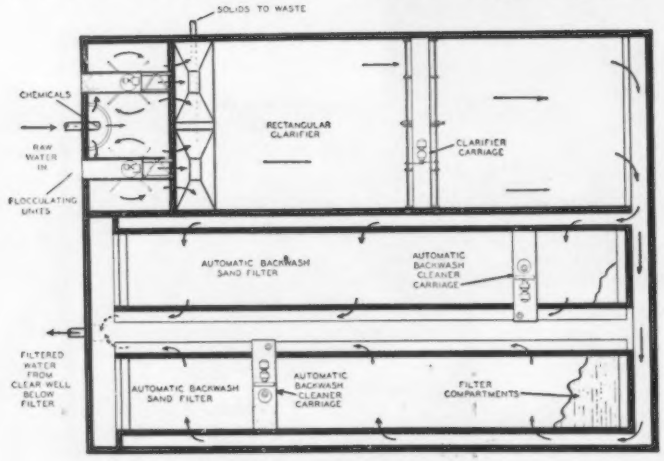

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For industrial and municipal water supplies, the Hardinge equipped water treatment plant is available in unit sizes of from 1 M.G.D. to 5 M.G.D. Flocculation, clarification, and filtration equipment-combined in modular units and sized to your requirements for a continuous supply of high-quality water. Can be furnished complete with automatic plant controls.

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W. Stewart, founder and president of the Stewart Bag Co. which has been acquired by the new firm, and Louis W. Sutherland Jr., vice president and treasurer.

Plans call for expanding the firm's operations immediately to three times the present potential of the Stewart Bag Co., either at that firm's present plant or at a new location.

J. S. Francis

Waring Envelope Elects Francis President

James S. Francis, formerly president of the J. S. Francis Co., exclusive northeast U.S. representative of the Union Envelope Co. of Richmond, Va., was elected vice president of the Waring Envelope Corp. of N. Y.

The Waring Envelope Corp. manufactures a complete line of business envelopes.

Jackson Corrugated Box Moves To New Location

Jackson Corrugated Box Corp., maker of double-face corrugated shipping containers, has completed its move to a new location at 3524 Wayland, near Reynolds field, Jackson, Mich.

Jackson Corrugated Box Corp. serves an area within a 120-mile radius of Jackson. It was formerly located at 324 S. Otsego.

Hinde & Dauch Names Manager for Eaton Plant

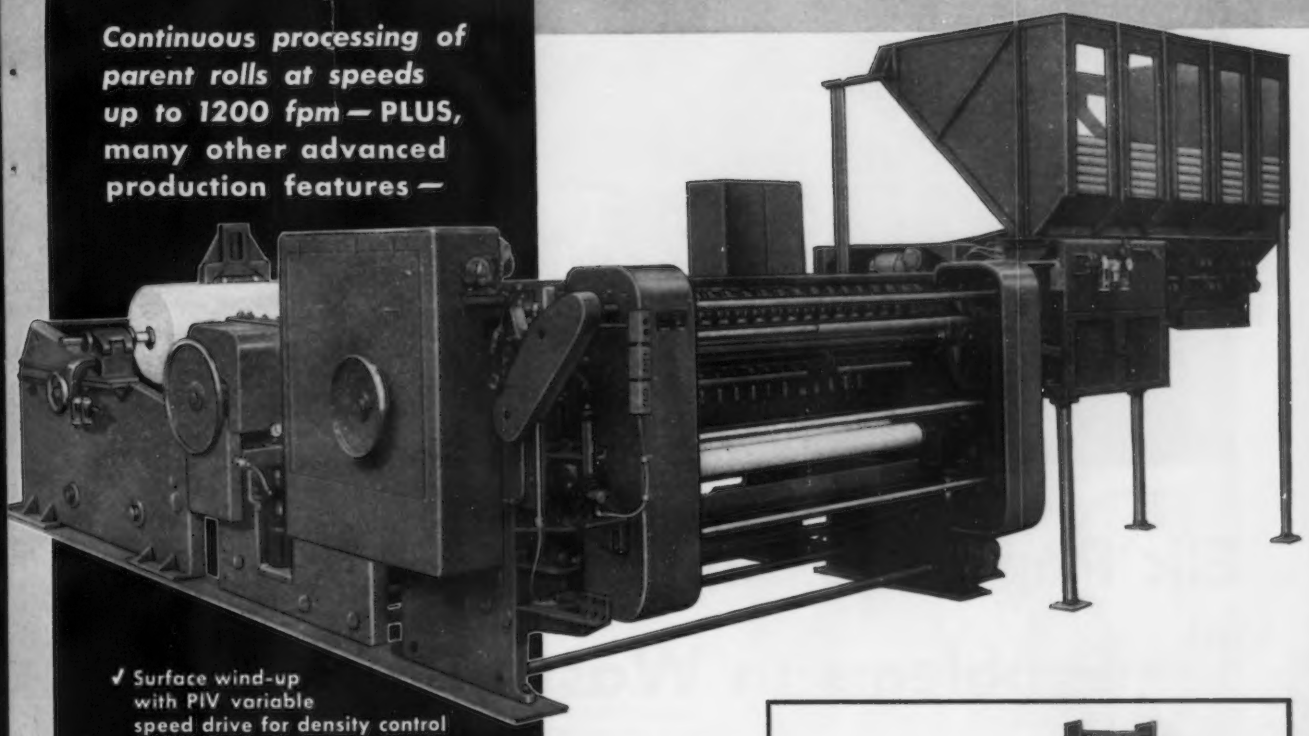
F. Paul Andres, manager of the Dayton sales office for the Hinde & Dauch division of the West Virginia Pulp & Paper Co., has been appointed sales manager of Hinde & Dauch's box plant in Eaton, Ohio. The appointment was announced by Paul H. Roberts, regional sales manager.

HUDSON SHARP's 60-B ROLL WINDER

new, improved automatic

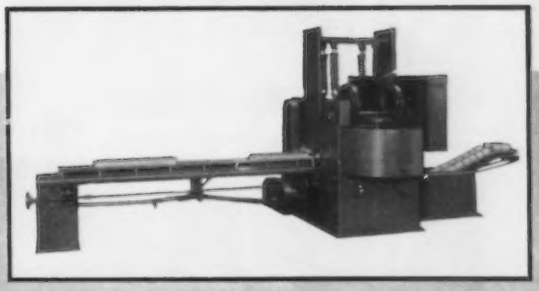
delivers facial type tissues with Clean-cut Perforations

Continuous processing of parent rolls at speeds up to 1200 fpm — PLUS, many other advanced production features —



- ✓ Surface wind-up with PIV variable speed drive for density control
- ✓ Belt driven unwind for positive tension control—less web breakage
- ✓ Does not slow down for cut-off
- ✓ Positive clean cut or conventional type sheet perforations
- ✓ Binds paper to core with cold glues—permitting economical re-use of culls
- ✓ Handles web widths up to 93"
- ✓ Accurate sheet or measured roll count
- ✓ Automatic core loading (optional) makes for complete automation
- ✓ Automatic stripping of finished rolls or logs
- ✓ Continuous trouble-free operation

The perfect production companion



Hudson Sharp Roll and Package Cutter

delivers up to 150 Rolls or Packs per minute!

Continuous running band knife operation produces toilet tissue, towel and other paper wound rolls or packs with clean cut, straight square edges—no crushing, no cuts on bias, and minimum waste at end cut trim. Economical — machine effects knife cost savings of 50% and more! Double lane production delivers 80 to 150 rolls or packs per minute, dependent upon product length. Cuts 4" to 12" in ½" increments from log girths of 4" to 5½". Ideal for continuous high speed in-line operation with Hudson Sharp's 60-B automatic Roll Winder. Get the complete facts on this highly dependable production team, today.

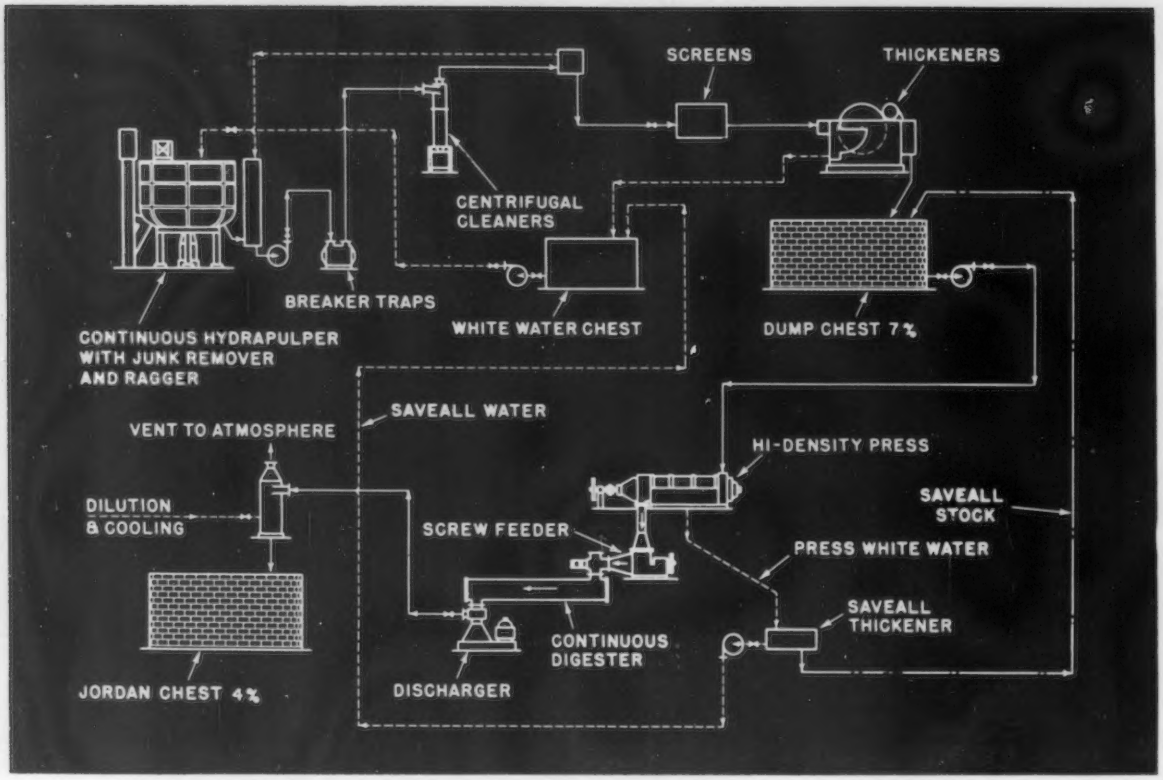
Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

FMC Packaging Machinery Division

Hudson-Sharp Machine Company

1201 MAIN STREET, GREEN BAY, WISCONSIN



Elk Paper Co. Eliminates Asphalt Problems in Waste Paper Stock

New cleaning and dispersion system proves a successful solution to the presence of asphalt and other thermoplastic materials found in mill's paper stock supply.

A new system of equipment to improve the cleaning of waste paper stock for corrugating medium is now operating in the mill of Elk Paper Manufacturing Co., Childs, Md. Designed especially to disperse asphalt and various thermoplastic materials present in waste paper furnish, the system has successfully up-graded the appearance of the .009 corrugating board which Elk manufactures for the packaging industry and has greatly reduced the frequency of shut-downs for cleaning paper machines wires and felts.

The new installation combines mechanical cleaning and continuous heating equipment manufactured and was supplied as a complete unit by The Black-Clawson Co., Shartle Division, Middletown, Ohio, that labels it The Petro-Diffusion System. The P-D System is designed to provide a compact, low-cost equipment package to solve a specific problem; namely, that the asphalt and similar saturants and laminants in waste paper stock have long been a costly and troublesome burden to many board mills. Ordinary methods of cleaning and refining do not remove or disperse the agglomerated materials sufficiently to eliminate visible spotting of the end product and the clogging of paper machine wires and felts. The problem is intensified by the troubles that converters and printers experience with asphalt spotted board.

To achieve effective dispersion, the P-D System employs a two-phase treatment. First a mechanical cleaning phase produces uniform stock with the asphalt particles well distributed. Subsequent heating of the stock under pressure in a modified Pandia horizontal tube continuous digester system then melts the particles to the point where the oils and tars are partially vaporized and the remaining carbonized sediment be-

comes thoroughly diffused in the fibers.

Operation at Elk Mill

The Childs mill of Elk Paper Manufacturing Co. produces approximately 165 tons per day of .009 corrugating medium from waste corrugated box papers. The production is made on three fourdrinier machines trimming 87 inches, 90 inches and 112 inches.

Ahead of the Petro-Diffusion System, the baled waste is slushed in a hydrapulper with ragger and junker and given primary fiberizing and cleaning in two Sutherland breaker traps, two vibrating screens and centrifugal cleaners.

The stock then goes to three new Black-Clawson thickeners which discharge to a dump chest at seven per cent consistency. White water from the thickeners is collected and dumped to the Hydrapulper for dilution. A Shartle HMSS pump moves the thickened stock directly to the inlet of a Black-Clawson Hi-Density press which raises the consistency to approximately 35 per cent. White water from the press is returned to a saveall thickener.

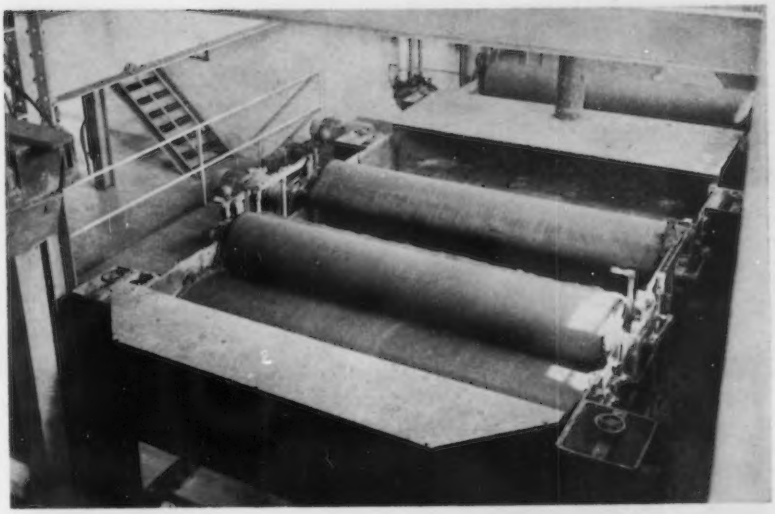
The stock drops from the discharge of the screw press directly into a 15-inch Pandia screw feeder, feeding the Pandia continuous digester. The digester consists of one 36-inch-diameter tube with a 28-inch discharger. Steam at 80 lbs. pressure is introduced into the digester tube to raise the stock temperature to approximately 300 degrees F. At this temperature the asphalt reaches a fluid state most suitable for diffusion.

From the discharger, the stock is blown continuously through two motorized discharge valves and blow lines to a cyclone tank where dilution water is added. The stock then drops to a storage chest that supplies the jordan refining system.

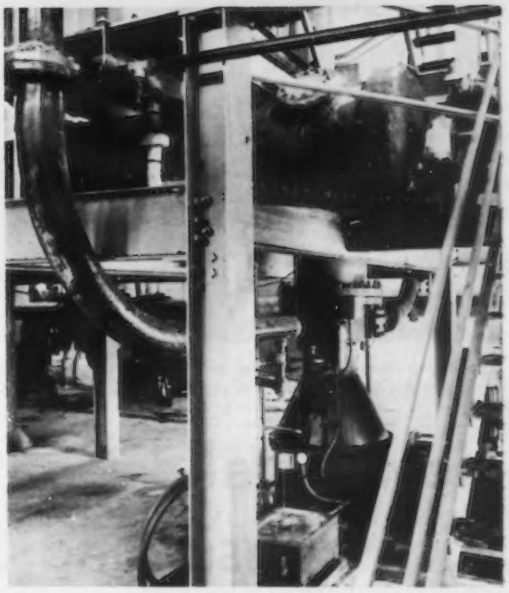
Results Obtained

Since its start-up April 1, the system has maintained a capacity of 165 tons per day and has attained 180 tons for several prolonged periods. Steam consumption averages 1660 lbs. per ton and power consumption is one horsepower per ton per day.

In addition to marked improvement in the visual appearance of the paper and reduction in machine shutdowns, the vice president and mill manager at Elk, W. Francis Bathon, reports that the system has contributed to improved sheet formation and a higher standard of .009 quality tests, as confirmed by independent testing laboratories.

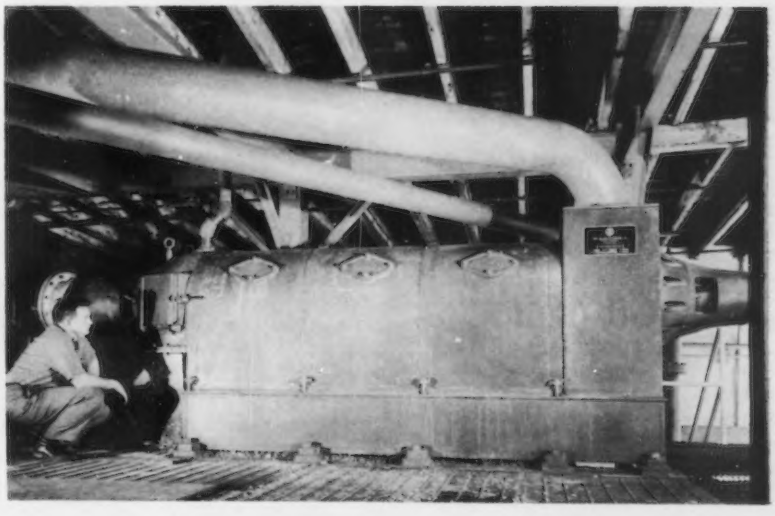


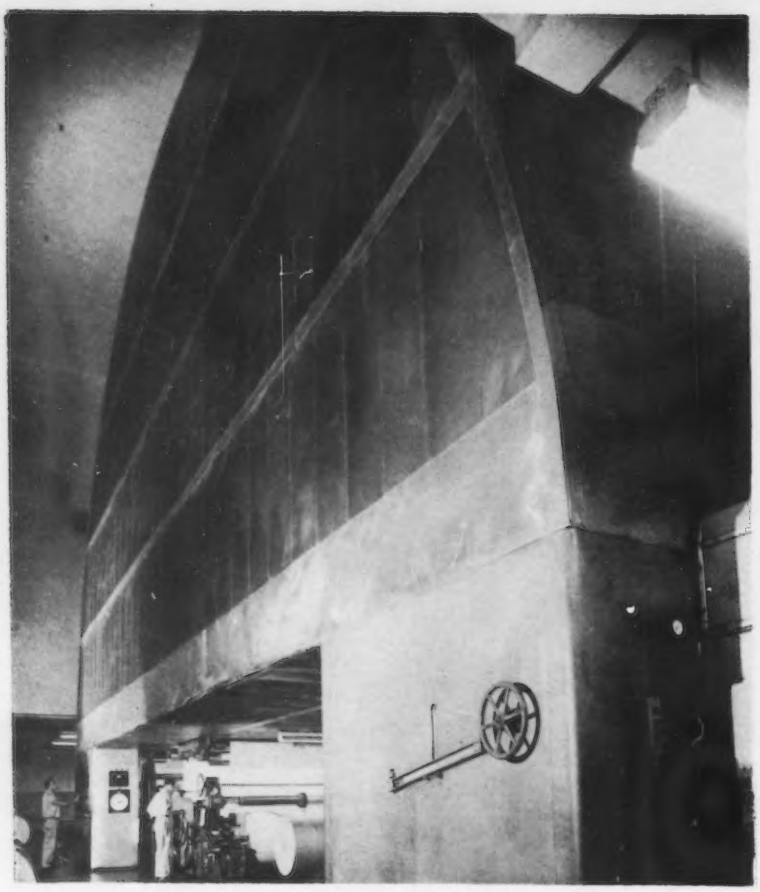
▲Stock from waste paper cleaning system is thickened to seven per cent consistency on three new Black Clawson thickeners.



Continuous heating of ▶ stock and blowing under pressure is done in a single Pandia digester tube (above) and discharger with twin blow lines (below).

▼ W. F. Bathon, vice president and mill manger, inspects Hi-Density Press which delivers stock at 35 per cent consistency to the digester.





The three-story-high coating machine is the only diazo machine in the industry capable of handling paper up to 79 inches wide.

How Ozalid Coats Paper with Sensitizing Solution

At the Johnson City, N. Y., plant of Ozalid Division, General Aniline and Film Corp., much of the sensitized paper production is accomplished on a double width roll (up to 79 inches wide). The double width is significant in the fact that Ozalid's "Big Bertha" is the only machine in the industry capable of coating this size sheet. It does so at speeds in excess of 600 feet per minute.

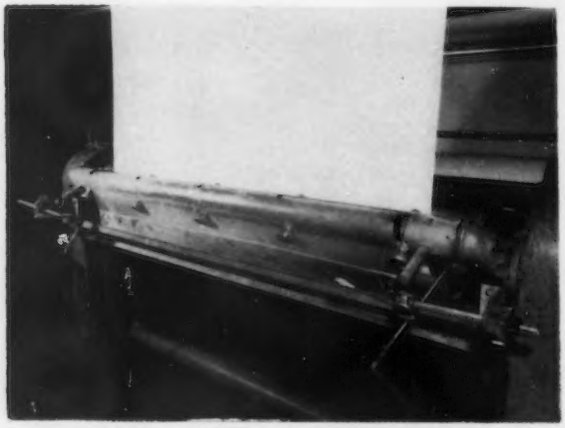
Backwetting Operation

The coating of paper is in continuous web, with a "flying splice" bringing a new roll into coating position as the roll being coated comes to an end. The paper unwinds from three foot diameter rolls through constant tension devices to a backwet coating station. Here a solution is applied to the back side to maintain the proper balance between temporary curl (the degree of curl a sheet has as it leaves the developing section of the Ozalid whiteprint machine), and permanent curl (the degree of curl a sheet will retain as it lays on a desk top or in a file cabinet).

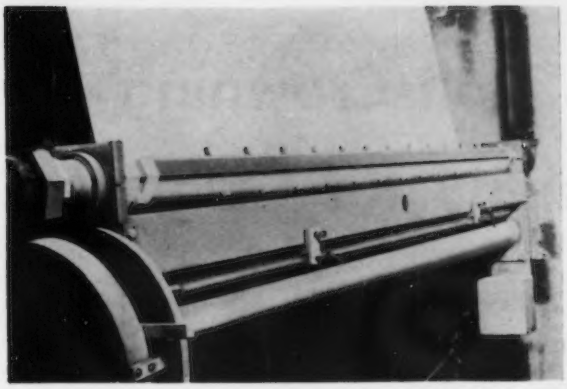
Sensitizing Coating

After drying the first coat or backwet, the web enters the sensitizing station where the characteristically yellow solution is applied. Application occurs by the web traveling lightly over (kiss contact) a pair of applicator rollers dipping into the coating spray. An excess of solution is evenly applied. After a suitable imbibition time, the web is doctored by an air knife. The air pressure is measured by a mercury manometer. The desired amount of coating deposited is determined by calculation and formulation balance and then continually verified by an actual end-use test at the beginning, middle and end of every roll processed.

The flying splicer brings the new roll into coating position as the roll being coated comes to an end.



Curl control back treatment station where solution is applied to the back side to control curl effect.



Cutting knife operates to cut the roll to the predetermined size. Rolls 79 inches wide may be coated by "Big Bertha."

Excess solution is evenly applied at sensitizing station after controlled imbibition. Air knife doctors web.

The paper is again dried after sensitizing, to a moisture content that represents the perfect compromise—not too dry to be brittle, not too moist to hasten "pre-coupling" in the package.

The amount of solution left on the web at the sensitizing station represents a careful balance of chemicals that will give the correct and consistent printing speed at the proper dye density. It must penetrate the surface of the paper enough to remain "attached" and yet not penetrate too deeply to hinder development in the printing machine. Once the conditions necessary to produce all the desired features are determined, the double width rolls, rapid web speeds, and mass production methods of paper and solution handling assured uniformity.

Chemical formulations are developed by Ozalid's Research and Development Laboratory. Once the proper ratios and ingredients are worked out to give the desired printing speed, color, dye density, brightness, smoothness and curl, uniformity is maintained by quality control of the incoming paper bases and raw chemicals.

Quality control begins with the raw materials—paper and chemicals. Very close contact is maintained with the paper manufacturers through an exchange of laboratory tests of the paper. These tests, in the form of graphs, cover such items of control as Mullen (burst), tear, fold, caliper (thickness), penetration, porosity and weight. The results of these quality control tests are exchanged with the manufacturer of the paper for comparative purposes. Very close contact is maintained with each supplier of raw chemicals used. Again, data and results are exchanged in a joint effort to obtain ingredients with very critical "built-in" properties.

Control technician uses loud speaker connection to report test results to production area. Note pneumatic tubes at the right.

Testing on the Fly

With web speed of 600 feet per minute plus, it becomes necessary to evaluate each coating test rapidly and "on the fly." Each coating machine at Ozalid has an intercommunication with the test section as well as a two-way connection via pneumatic tube system. Samples are taken at start and end of rolls as well as in the middle of the roll. Basically, these samples are checked for emulsion and density, and uniformity across the width of the roll. Also, since customers use this paper to the very edge, samples are checked for edge effects such as back spring. The middle of the roll samples are obtained by manual cuts of about 20 per cent of the width from either side of the web. This is accomplished at speeds of 600 feet per minute plus, by an operator who takes a back-handed cut against the roller with a knife in a circular motion. This he accomplishes without the web. The sample is tested by the operator on the spot for moisture content, trimmed and sent via pneumatic tube to the quality control laboratory for end use testing. Should the tests indicate the need for a correction, the coating machine operator is notified via intercom and the finished test sent back to the operator through the pneumatic tubes.

Even the testing methods are tested; all standards to which the testers refer are selected and checked by delicate instruments such as the Densitometer and the Sensitometer. Some such instruments have been specifically designed by Ozalid and accepted by the industry in general as the standard of testing.

Other Plants and Products

In addition to sensitizing paper at Johnson City, N. Y., and at its La Habra, Calif., plant, Ozalid produces many specialty items such as paper intermediates from which reprints can be made, foils (intermediates on transparent film), cloth, Mylar, paper lithographic plates, duplicating microfilm, and a host of accessory products such as correctors, ammonia masking agents, sensitizing lacquers, cleaners, and carbons. A machine plant at Vestal, N. Y., produces whiteprint machines ranging from small desk top models for office copying needs to high production whiteprinters for engineering use.

A New Approach to Roll Crowning — Particularly for Calenders

The forces and deflections of all the rolls in a stack must be considered and an analysis made of them in order to determine proper crowns.

Howard E. Kuehn,
Division Engineer, Rolls,
Farrel-Birmingham Company, Inc.,
Ansonia, Conn.

To insure the best operation, paper mill rolls must have the proper amount of crown and correct crown shape.

The analysis and technique of measurement described here has proven very successful for many installations. It is applicable to chilled iron rolls, steel rolls or any type of all metal roll. For years, crowns were based on cut-and-try methods, which consisted of applying a trial crown on a set of rolls, setting them up in operating position and light-testing them, and then regrinding if they did not pass this test.

Another procedure was simply to put the rolls in service and check the sheet being produced, and again regrind if the quality of product was not satisfactory. Many times, successfully operating roll combinations or stacks with known crowns were used as a guide in selecting crowns for new conditions. This procedure, of course, left much to be desired due to the fact that, even though conditions appeared similar, often they were quite different.

In the period 1952 to 1954, Farrel-Birmingham engineers made a study of the calculation of roll crowns for paper calenders. This study and analysis took into consideration only the deflections which exist in connection with the bottom roll of a paper calender stack. Experience with the application of this formula indicated that something had been overlooked in the analysis.

During 1955 and 1956 Farrel engineers made a further study of this problem and elaborated on the original analysis made in 1954. This study indicated that it was necessary to take into consideration the forces and deflections of all rolls in a stack and then make an analysis of them in order to determine proper roll-crowning procedure.

Various Roll Combinations

A description of the various types of roll combinations and methods used to apply additional nip pressures in connection with crown considerations is essential. Figure 1 illustrates a variety of two-roll combinations. These examples are elementary but serve as a good starting point. The illustration shows two rolls of the same size mounted vertically, two rolls of different diameters mounted vertically, two rolls of the same diameter mounted horizontally, two rolls of different diameters mounted horizontally, and angular mounting of the same diameter rolls or different diameter rolls.

Additional loads are often applied to these combinations for increased nip pressure. If, with two rolls placed vertically, the top roll is fixed and pressure is applied to the bottom roll either by direct load or a lever system, the crowns will be different than if the bottom roll is fixed and the top

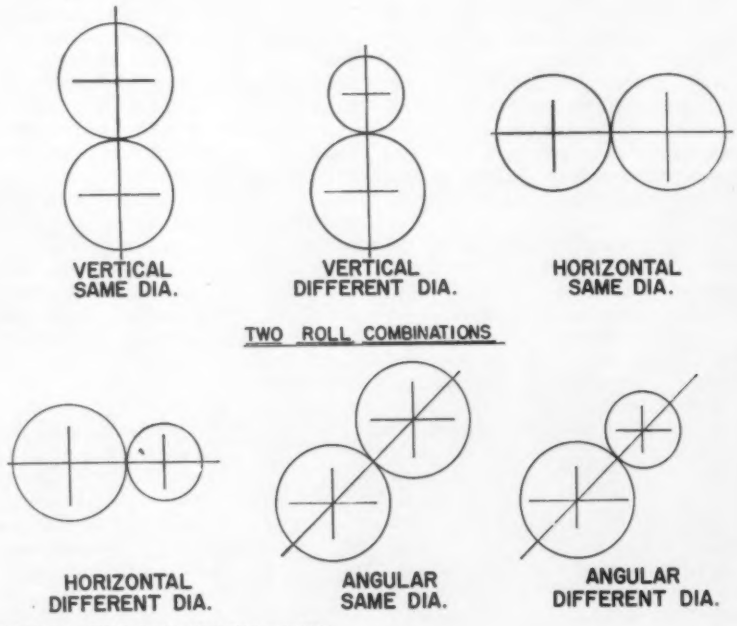


FIGURE 1. TWO ROLL COMBINATIONS.

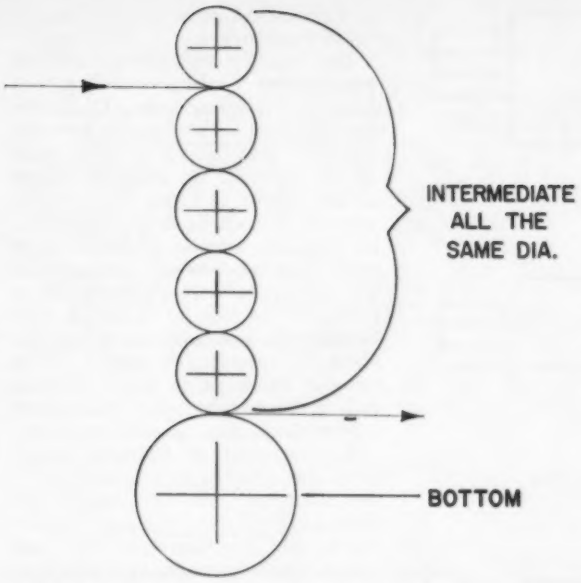


FIGURE 2. CALENDER WITH ALL ROLLS ABOVE BOTTOM SAME DIAMETER.

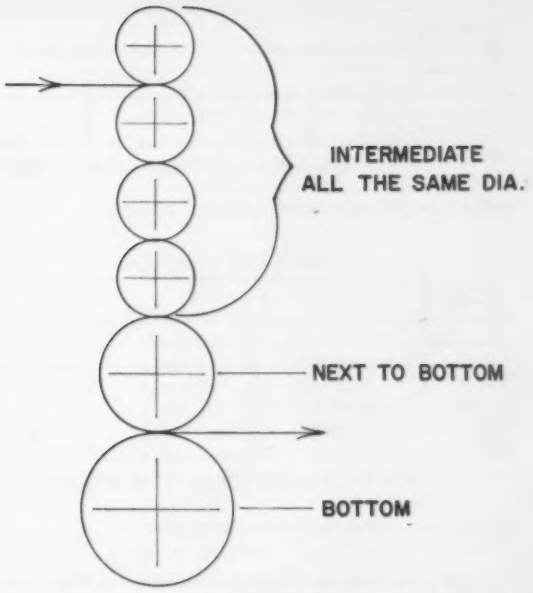


FIGURE 3. CALENDER WITH QUEEN ROLL. Queen roll diameter between intermediates and bottom roll diameters.

roll creates the nip pressure. Figure 2 shows a typical arrangement of a calender stack with all intermediate rolls of the same diameter.

Six rolls suitable for five nips are illustrated, but, of course, the number of rolls might be varied from two to as many as 11, with additional load sometimes being applied to the top roll to increase nip pressure. Figure 3 illustrates the same stack arrangement, except in this case the roll next to the bottom, commonly called the queen roll, is of different size. Figure 4 illustrates a calender-stack arrangement with queen and top roll diameters greater than the intermediates.

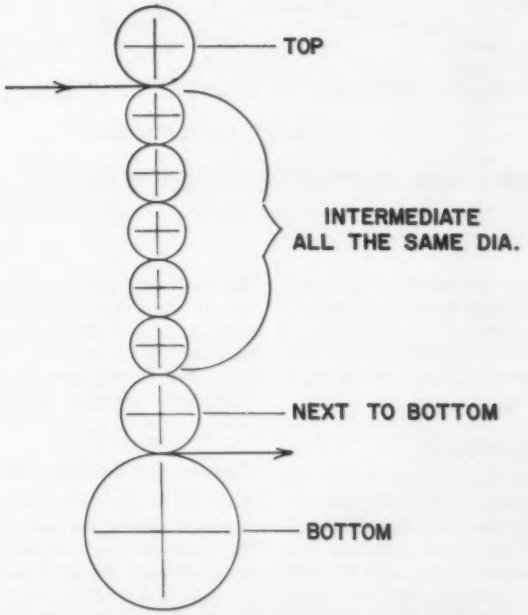


FIGURE 4. CALENDER WITH QUEEN AND TOP ROLLS. Queen and top rolls usually same size. Intermediate smaller.

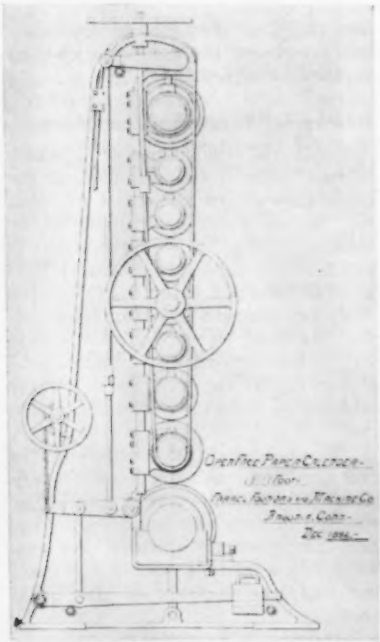


FIGURE 5. DRAWING OF AN OPENSIDE TYPE CALENDER DATED 1892.

A number of openside calender stacks have been built in recent years. This construction is not exactly new, however, as a search through our files turned up a drawing dated December 1892 of essentially an openside stack arrangement. (See Figure 5.) This stack was in operation until eight or ten years ago.

When increased nip pressure is required, there are different methods of applying additional load to the various roll combinations. The addi-

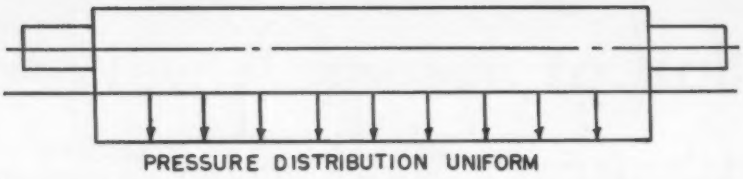


FIGURE 6A. RESULTS WITH CORRECT CROWN.

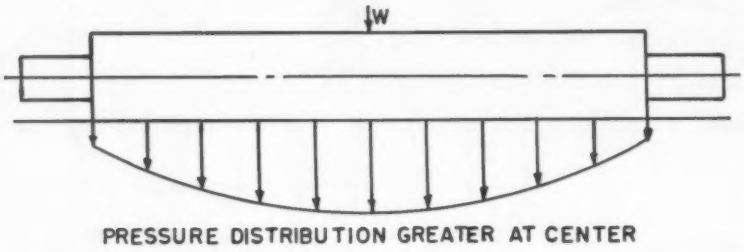


FIGURE 6B. RESULTS FROM OVERCROWN.

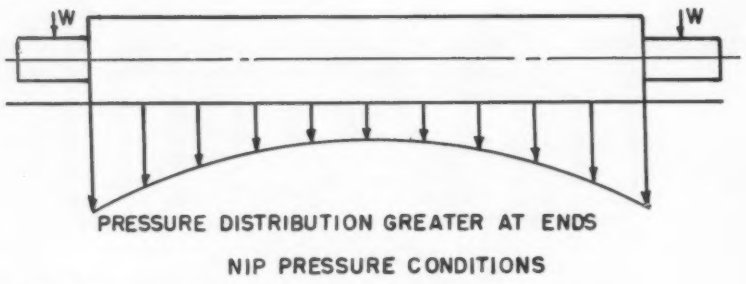


FIGURE 6C. RESULTS FROM UNDERCROWN OR WEIGHT OF BEARINGS.

tional load may be obtained by a mechanical lever-and-weight system, a pneumatic cylinder or hydraulic cylinder applying load on the roll centerline either directly or through a lever system.

Primary Objective

The primary objective in crowning rolls is to obtain a uniform pressure distribution at the roll nip. If a roll body were supported on a flat surface which had no deflection and the roll were ground straight, and the journal weight not taken into account, uniform pressure distribution across the face of the roll would be obtained, as shown by Figure 6-A.

Let us now assume that an additional load "W" is added to the center of the roll. This would produce a pressure distribution as shown by Figure 6-B. If we then remove the weight in the center and apply weights "W" on each end of the roll at the journals, or bearing centerlines, the pressure distribution would change, as shown in Figure 6-C.

To illustrate this point, consider a flat scale on a flat surface. Light cannot be observed at the joint. If pressure is applied at the center or at the ends of the scale, light still cannot be seen, but it will be readily apparent that the pressure, or nip distribution, varies.

Crowns for Various Combinations

Now let us consider proper crowns for various stack combinations, or roll combinations. First is a two-roll arrangement, in which both rolls are the same diameter and weight and mounted in the vertical position, with the bottom roll fixed. In this case the crown is calculated for the bottom roll and then for the top roll. The bottom roll will deflect a greater amount than the top roll, due to the fact that its deflection is caused by the weight of the top roll and its bearings, plus the weight of the bottom roll body. Since the top roll is supported by the bottom roll over its face length and this has been considered in calculating the deflection of the bottom roll, the weight of the to roll body over the sheet width can be disregarded in calculating the top roll deflection.

The bearing weights, or bearing weight plus loading, will create a variation in nip pressure. Therefore, the deflection with which we are concerned is that caused by these loads on the top roll. We designate these crown figures as basic crowns. The sum of the two basic crown figures is, then, the amount of crown to be applied to the two-roll combination. The total crown can all be applied to either of the rolls, or it can be split between the two rolls in any way desired. A common procedure for a two-roll combination with identical rolls of the same size is to crown both rolls with the same amount of crown.

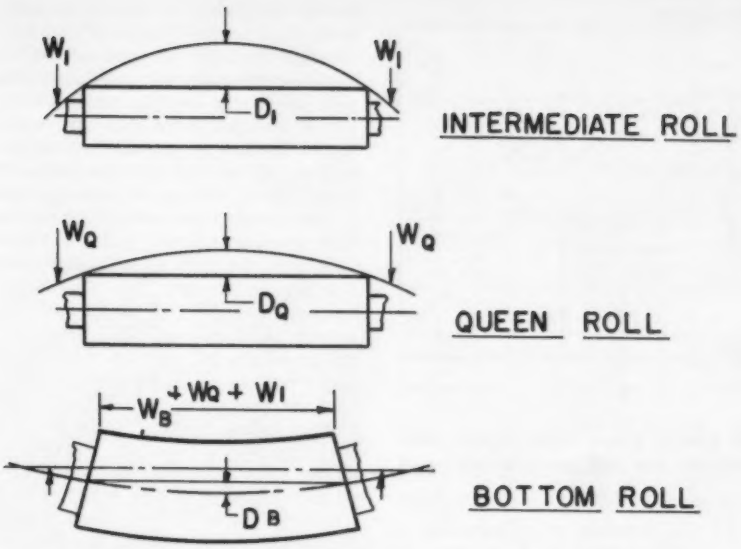
For two rolls of different diameters, the procedure is identical to that used for a two-roll combination when both rolls are the same diameter. In this case, however, the crown is sometimes distributed proportional to the diameters to avoid speed differentials between the center and the edge of the sheet.

When we consider the two-roll combination with the rolls mounted in a horizontal position, we are only concerned with the separating force or nip pressure between them; the weight of the roll bodies or bearings need not be considered. In the case of a two-roll arrangement with the rolls mounted in an angular position, we simply have to resolve the weight of the upper roll into its component forces to determine the amount of nip pressure being applied by the weight of the upper roll to the bottom roll, and then proceed to calculate crowns on the same basis as the vertical arrangement.

Crown for Three Rolls or More

For a roll arrangement in which three or more rolls are involved, the basic crowns are calculated for each roll having a different diameter, or loading. Once this information is available, the analysis shown by Figure 7 is followed, using the calculated basic crowns as a base for determining the final crown information. It will be noted from this diagram that the intermediate roll has a greater amount of deflection than the queen roll.

This is due to the difference in roll size and the effects of bearing weights, journal weights, and other items which may be supported by the bearings, such as doctors and catwalks. In analyzing such a roll combination, the decision is first made that the intermediate rolls will be ground straight, since they usually have the same bearing weights and same geometrical shape. The crown



Crown for intermediate = straight. Crown for queen = $2(D_i - D_Q)$

Crown for bottom = $2[D_B + D_Q - (D_i - D_Q)]$ **Deflection (D) = 1/2C (crown)**

The addition or subtraction of the same dia. rolls at the top of the stack, only effects the crown on the bottom roll.

If all rolls above bottom are same dia., only crown bottom.
If queen roll is a different dia. than inter., both bottom and queen must be crowned.

FIGURE 7. CROWN ANALYSIS PROCEDURE.

for the queen roll is then determined by multiplying the difference in the deflection of the intermediate roll and the deflection of the queen roll by two.

Now, since some crown has been added to the queen roll, we have not only compensated for the difference in deflection between it and the intermediate roll but the same amount has also been added to the bottom side of this roll. In considering the crown for the bottom roll, therefore, this amount must be subtracted from the deflection of the bottom roll, which is downward. The crown for the bottom roll is determined by multiplying the algebraic sum of the bottom roll deflection and the queen roll deflection by two and subtracting the queen roll crown from this. The addition or subtraction of rolls of the same diameter at the top of the stack only affects the crown of the bottom roll, since the relationship of the intermediate rolls and the queen roll remains the same.

If all rolls above the bottom roll are of the same diameter, crown is applied only to the bottom roll. When the top roll is a different size than the intermediates below it, the amount of crown required for this roll must be calculated and then analyzed to determine whether or not the crown required is a positive or negative crown. In other words, if the deflection of the intermediate roll is greater than the deflection of the top roll, the top roll may have to be crowned with a reverse crown, or concave, shape. Usually, when load is applied to the top roll, the top roll has to have a positive crown because its deflection will then exceed that of the intermediate roll.

Jacking Not Desirable

Jacking, or blocking, of rolls for the application of weight is not desirable, because this practice, in many cases, overloads the intermediate roll bearings. The roll immediately below those being jacked, in most cases, will require crown, due to the additional load on the journals. If the rolls which are jacked are then put back in service, this crowned roll must be removed because it will not give proper nip-pressure distribution.

All Weights Essential

In view of the analysis of the nip-pressure distribution and the roll crown for intermediate rolls, it is quite clear that any weight which is applied at the bearings on intermediate or top rolls must be considered in the crown calculations. By this is meant doctor weights, bearing weights, catwalks, etc. in openside stacks. The effect of these weights must be transferred to the center-

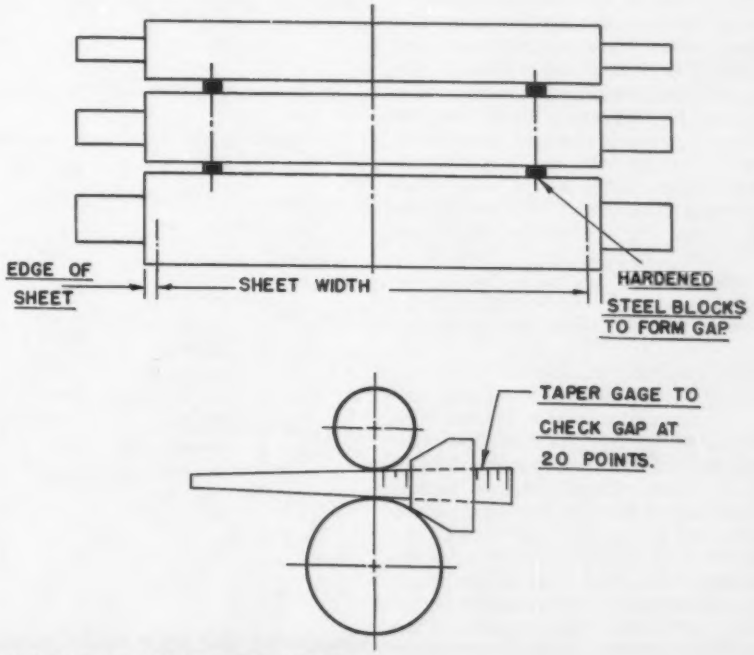


FIGURE 8. GAP CHECK FOR NIP PRESSURE.

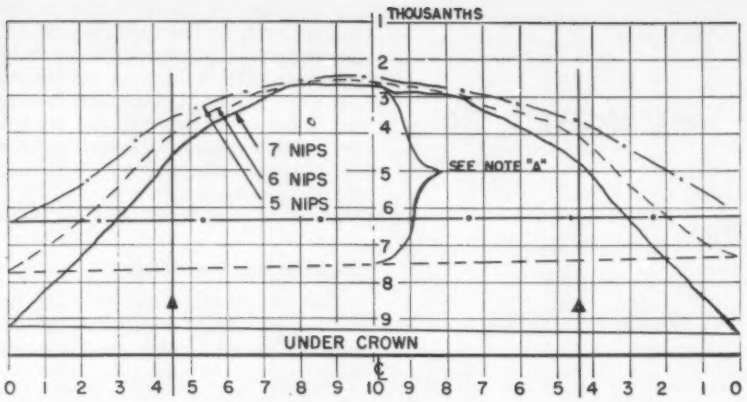


FIGURE 9. GAP CHECK CHART. Crown .055 Bottom. Crown .0047 Queen. Note "A"—Distance between curve and line represents one half required additional crown.

line of the bearing while the bearing arm is supported at the pivot point, and the arm held in a horizontal position. Doctor weights, inboard and outboard, have a very marked effect on the crown calculation in an open-side stack.

It is entirely possible to alter the crown shape or to obtain conditions which will produce satisfactory results by the use of air jets, pads, jacks, or other devices, all of which either contribute to changing the temperature by cooling or heating of the roll and in this way alter the dimensional size or alter its deflection characteristics. It is quite evident that by cut-and-try methods of jacking, lifting, or weighting rolls, conditions can be obtained to produce a saleable sheet, but not necessarily the best. All of these methods are very difficult to control and reproduce, due to the fact that in most cases they cannot be measured. Each time the type of paper is changed, or often at shift changes, the result is inferior production. Since many mills must produce different grades and widths of paper, the application of crowns becomes a compromise at best. It is much better, of course, to base a compromise on exact knowledge of what the correct conditions should be, because conditions can then be altered with greater certainty of obtaining the best results.

Devices are available to cope with this problem by means of individually controlling the deflection of rolls in a stack. These devices permit variation of the nip pressure with a given set of crowns. For some of the newer wide machines with large diameter rolls, such a unit provides a means of running a larger number of nips with less nip pressure than would be possible if roll weight alone is utilized.

In the analysis of roll crowns, it is very important that the rolls be set up in the calender and checked in the exact manner for which the crowns were calculated. Again it should be emphasized that any analysis of crown requirements on a particular roll combination is only suitable for the conditions specified, unless a device such as that just described is available. If any other operating condition is used, such as the removal or addition of rolls or of weight, or change of sheet width, the crown combination becomes a compromise.

Checking Nip Pressure

Once the crowns have been calculated and applied to the rolls, it becomes desirable to check by some method of measurement to determine whether uniform nip pressure exists. Various methods used for this purpose are a nip impression on carbon paper, or aluminum foil, or rubber pads. Carbon paper and aluminum foil show, by visual inspection, the condition at the nip, but do not help in determining the amount of correction needed. Rubber pads, likewise, give only an indication whether or not nip is correct. The rubber-pad method is to insert a number of uniformly thick rubber pads along the entire length of the nip, with small gaps between. A feeler gauge is then used to check the gap between the rubber pads. It can readily be seen that this would show the differences in the measurements, but would give no indication as to how much change should be made in the crown if uniform gap measurements are not obtained.

The carbon paper or aluminum foil methods, of course, are commonly used to check the nip condition for nonmetallic roll combinations.

A method for checking the nip-pressure distribution on a calender stack is shown in Figure 8. This is used to check the crown condition which exists with the rolls mounted in position. The procedure is to insert steel blocks, ground to precisely the same thickness, at two points along the face of the roll. The blocks are positioned in such a way that the resulting gap at the center of the roll and the edge of the sheet is uniform, provided proper crowns and roll shape exist. The taper gage is a

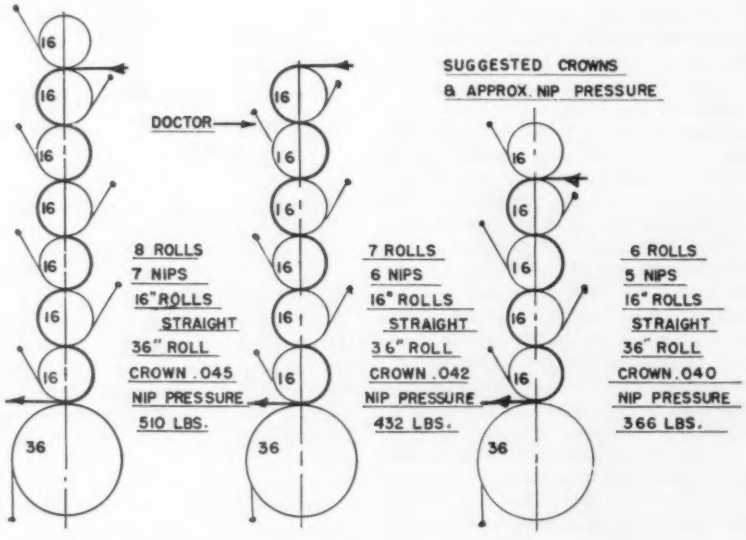


FIGURE 10. CALENDER ARRANGEMENT FOR 7, 6 AND 5 NIPS, with calculated crown requirements.

comparator and is calibrated in .0001" divisions. From this check, it can be determined whether we have correct crown, the amount of overcrown or undercrown condition and, therefore, whether the nip pressure is uniform. Correlation of measured data with accurate calculations provides excellent data upon which corrective action can be based.

Ideal Nip Curve

The ideal chart for uniform nip would be shaped like an ox yoke. If an undercrown condition exists, the curve will be upward, and for an overcrown, the curve will be downward. This chart, Figure 9, was made on a stack set up for three different conditions—eight rolls with seven nips, seven rolls with six nips, and six rolls with five nips. The bottom roll in this case had .035-inch crown and the queen roll .0047-inch crown. Note that as rolls are removed the height of the curve is reduced. Since the mill wanted to run seven nips, this chart would indicate that the crown should be increased by twice the amount indicated between the top of the curve and a straight line connecting the ends of the curve. This check will not tell where to make the correction. This must be determined from calculation and analysis, as already described.

In this case calculations indicated that there should be .045-inch crown on the bottom roll instead of .035 inch, with the intermediates all straight, as indicated by Figure 10. The bottom roll was reground and a gap test made, with the results shown by Figure 11. The gap test indicated that .012" crown should be added, whereas only .010 inch had been added. The reason for this is that the roll next to bottom had an outboard doctor, which caused a greater deflection of this roll than the next roll above with an inboard doctor. Since there was no means of compensating for this, the two deflections were averaged and this figure used in establishing the bottom roll crown. Figure 12 indicates the relationship existing between deflections of intermediate rolls which have variations in end effects or bearing loads. The technique described has been used for checking a number of roll combinations and for checking against calculated crown dimensions. Figure 13 is a set of graphs made from readings taken from another stack where the change in number of rolls altered the crown relationship from one of overcrown to undercrown.

Exceptionally good correlation has been obtained with this procedure

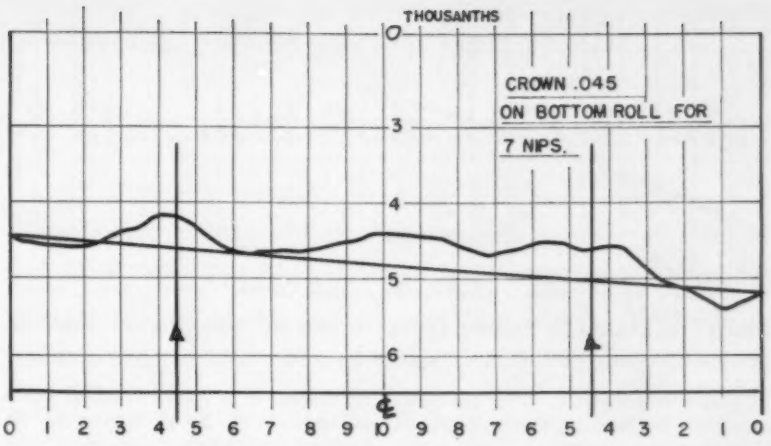


FIGURE 11. GAP CHECK CHART shows result of correct crown. This chart is in contrast to that shown in Figure 8 for seven nips.

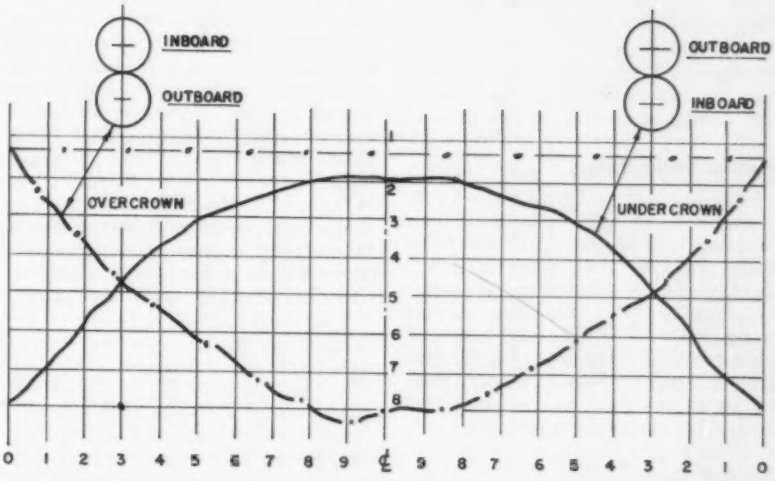


FIGURE 12. GAP TEST CHART illustrates effect of loading variation on identical rolls.

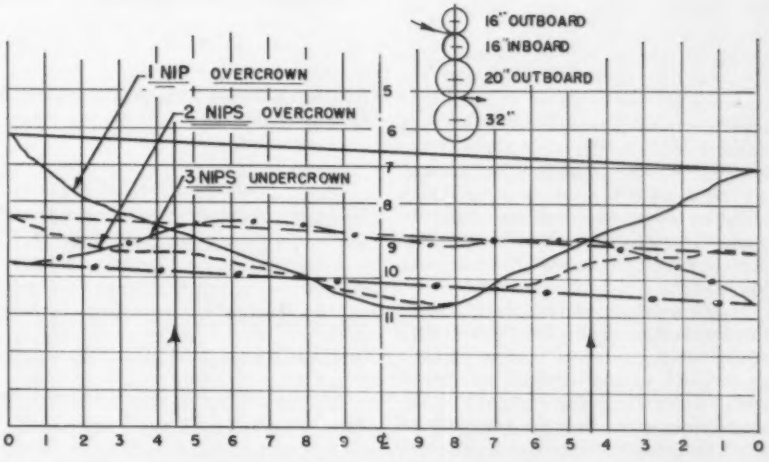


FIGURE 13. GAP TEST CHART illustrating change in conditions of nip pressure when number of rolls is altered. Bottom nip—32 inch diameter roll, .039 crown.

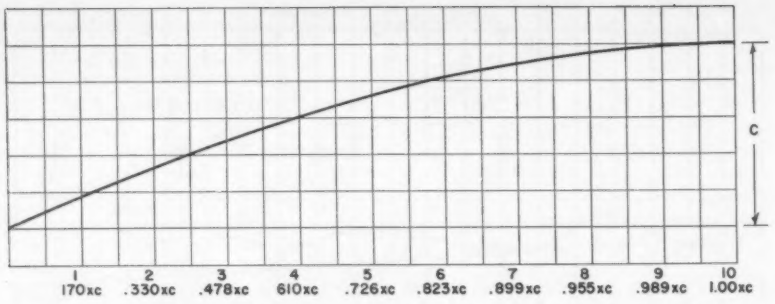


FIGURE 14. STANDARD CROWN CURVE TO PRODUCE UNIFORM NIP PRESSURE.

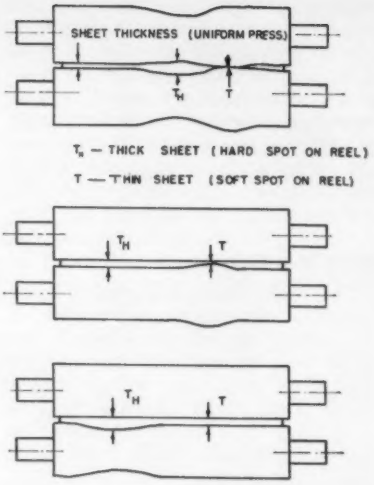


FIGURE 15. EFFECT OF POOR ROLL SHAPE.

in many installations. The old procedure of checking a roll stack through the so-called light-tight method has been eliminated. As mentioned before, the fact that a stack or combination of rolls is light-tight at the nip does not necessarily mean that uniform nip-pressure distribution exists. We have checked a number of cases both by calculation and measurement in the field and now rely on calculation and gap testing for determination of proper crowns.

Nonmetallic Rolls

When a crown problem occasionally includes nonmetallic rolls, we usually calculate the crown for the metal body, and the mill selects a crown for the nonmetallic roll based on this information. The hardness of the nonmetallic covering has considerable bearing on the crown selected and, in general, it seems to vary from 50 to 80 per cent of the calculated figure for the metal body.

Target Curve

The crown shape recommended and used as a target curve is shown in Figure 14. It is very important that the deviation of a crown shape from this target curve be held to a minimum. Minimum is used loosely here because this deviation can vary, depending on the type of paper being produced. For example, if we are dealing with a very thin sheet, a deviation of .0005 inch can be critical, whereas in running a very thick sheet or board it would be insignificant. It is also important that straight rolls be ground within close tolerances.

When a series of rolls is set up in the stack, it is really the relationship of the shape of the two adjacent rolls as well as proper amount of crown which determines the pressure at the nip. Sometimes attempts are made to alter the crown shape based on sheet caliper in order to correct faulty operation. This, of course, is not good practice, because, if one area is altered, it is bound to affect areas adjacent to it. To illustrate the effects of faulty roll shape, Figure 15 shows what happens if a hollow spot or a high spot occurs in two rolls at the same point along the face. The nip pressure would, of necessity, be less at the low spot than at the high spot. A high spot, of course, will immediately create a hot spot and this will become increasingly worse until equilibrium is reached. Roll shape should always be plotted against a target curve based on actual measured crown rather than specified crown.

Figure 16 illustrates a roll crown shape that would be unsatisfactory. In contrast, Figure 17, illustrates a crown shape that would probably be quite satisfactory, even though the deviations are somewhat larger than those shown in Figure 16.

Hard rubber-covered rolls are ground and checked with a conventional-type caliper. When grinding rolls with soft rubber covering the grinder is depended upon for accuracy since it is quite difficult to caliper such rolls accurately. The standard tolerance used by the roll-covering trade is .001" on all dimensions.

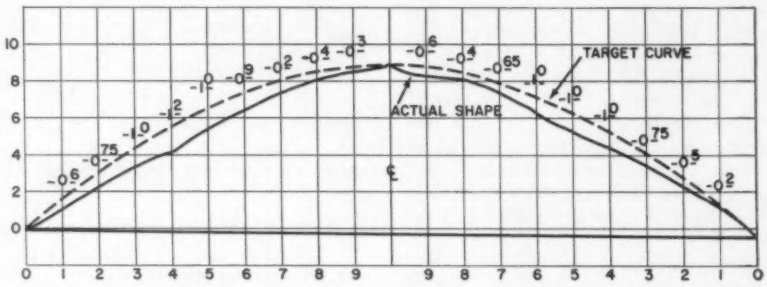


FIGURE 16. POOR ROLL SHAPE. Deviations from target in thousandths and ten thousandths of an inch.

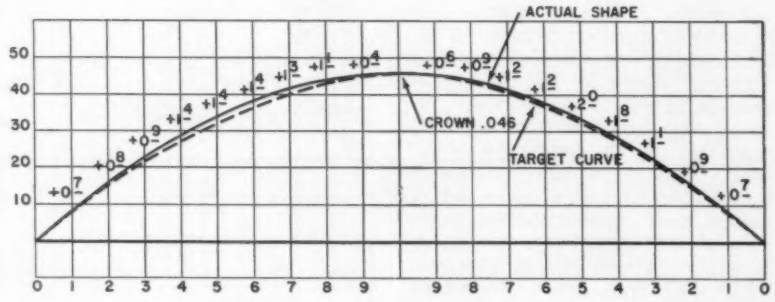


FIGURE 17. GOOD ROLL SHAPE. Deviations are shown from the target in thousandths and ten thousandths of an inch.

Latest Thoughts on Understanding The Response of Chemical Pulp to Refining

Recent developments in appreciating the effects of inherent wood variables and pulping and bleaching conditions are discussed in practical terms. Methods of measuring the response of pulp to refining are reviewed.

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Institute of Paper Chemistry

The variables in a pulp which affect the response of the stock to mechanical treatment may be classed under the two broad categories of pulpwood variables and pulping and bleaching variables. Under pulpwood variables we have such properties as fiber length, fiber diameter and lumen diameter, fibrillar angle, inherent fiber strength, lignin content, and the content, analysis, and distribution of the hemicelluloses. Under pulping and bleaching variables we may list mechanical damage in chippers, feeders, blow tanks, and so on, the completeness of dilignification, the removal, conversion, and redistribution of hemicelluloses and the degradation of the α-cellulose portion in both the pulping and bleaching operation. The various physical properties in the finished sheet will depend greatly upon the above variables and, of course, upon the response of the above properties to the beating and refining action.

Inherent Fiber Strength

There has been much discussion of the importance of the inherent strength of fibers in the past two or three years since Dr. J. A. Van der Akker and his associates at The Institute of Paper Chemistry demonstrated that a large proportion of the fibers in a sheet of paper actually do rupture in the course of a tensile break. Previous to that time it had been a rather widely held belief that bonding of the fibers one to another was of almost overwhelming importance and that few fibers actually broke, in, say, a tensile failure. Bonding is still to be considered an extraordinarily important factor, but now it appears that the strength of the individual fibers is also very much to be considered. Until very recently, we had no good means of estimating the ultimate realizable strength of wood fibers. Now it appears, from as yet unpublished work, that such estimates can be made with reasonable precision on the order of, say ±20 per cent. A very interesting point observed in this work is that the maximum realizable fiber strength of chemically pulped fibers is quite a bit higher than the strength of these fibers as they exist in the native wood. I mention this point because in our pulping and bleaching procedures we have had no yardstick to tell us how much damage to fiber strength was actually occurring, compared to the best obtainable of a given species. The indications of current research are that this situation may shortly be changed so that, if in one case we find a commercial process is giving us 90 per cent of realizable tensile strength no time need be wasted on development; but if, on the other hand, only 40 per cent of ultimately realizable strength is obtained a strong improvement program in that property may be called for.

Hemicellulose Content

The matter of hemicellulose content and distribution is now coming in for extensive research work in various organizations throughout the world. Improved methods of physical testing in just the past few years have shown that very striking physical differences between pulp can be attributed mainly to a difference in the bonding strength per unit bonded area of the fibers in the sheets of paper. While there may be some strictly morphological factors involved here, as will be discussed later, the inference is quite plain that the major difference is in the chemical constitution of the fibers and particularly in the modification and redistribution of the hemicelluloses originally present in the fiber.

Mechanical Damage

The above comments ease us into our discussion of pulping and bleaching variables: First, mechanical damage which with the advent of continuous pulping requires very searching re-evaluation. There is no doubt, from the accumulated evidence, that mechanical working of the chips at the right time near the beginning of a cook will greatly improve penetration and improve the fiber obtained from the cook. Mechanical damage at the wrong time in feeders or in continuous digesters can greatly reduce yield and adversely affect physical properties. This, unfortunately, is often the function of the specific system involved; it is certainly an item that should be looked at if inexplicably poor pulp properties are encountered.

Completeness of Delignification

Completeness of delignification is a rather obvious factor in mechanical response to refining which also needs re-evaluation in view of newer pulping techniques which alter the lignin-hemicellulose ratio in the pulp from that which has been conventionally encountered in regular sulphite or regular kraft pulps. The redistribution of hemicelluloses during pulping and bleaching was commented upon briefly above. There is absolutely no doubt that if hemicelluloses can be retained with the proper molecular weight and composition relationship a very easy beating pulp is obtained—one that

Condensed from the paper "Response of Chemical Pulp Wood Fiber to Mechanical Treatment" presented at the 1960 Spring Meeting of the Maine-N. H. Section of TAPPI.

will ordinarily give an excellent balance of physical properties. The results obtained in so-called Sivola-type cooking, which is two-stage bisulphite, neutral sulphite pulping, are quite impressive from this point of view. Recently, in strictly alkaline pulping, Hartler has shown that the addition of sodium borohydride to a kraft cook increases the yield from 46.7 to 51.2 per cent. This pulp contained up to 80 per cent of the glucomannan originally present in the wood as compared to about 30 per cent for an ordinary kraft pulp. When compared to a normal kraft pulp this higher yield material was brighter and was more readily beaten but showed typical kraft strength properties. While sodium borohydride pulping is economically unfeasible at the moment, this is a strong indication of the direction that chemical pulping must take to produce the improved products required for the future.

α-Cellulose Degradation

Finally, before leaving the matter of pulping and bleaching variables, we would comment that degradation of the α-cellulose portion during pulping and bleaching is the worst offender in reducing orginally high fiber strength. Now that we realize the very great importance of fiber strength, it has become almost commonplace in the industry to pay more and more attention to exerting great care in commercial operations to avoid unnecessary degradation.

Techniques of Measurement

If we are to determine the response of chemical wood pulps to the refining operation there must be good methods of measuring this response. Measuring it only in terms of the derived properties of the finished sheet of paper are quite unsatisfactory, primarily because of the great blend of factors which enter into any given finished sheet property.

Fiber Length

In beginning a discussion of wet pulp relationships we must not neglect the importance of fibers, fibrils, and fines in producing strength and optical properties in the finished sheet. Dr. W. Boyd Campbell elucidated the generally accepted surface tension theory of sheet formation. He pointed out that as a wet web of paper dries, the greatest single compacting force involved in drawing the fibers together is that of the surface tension of the various menisci of liquid which retreat in the interfiber pores as drying proceeds. The smaller these pores are, the greater the effect of this surface tension action. Therefore, the presence of fibrils and of fines contributes greatly to the forces which naturally compact a sheet. In determining the response of a pulp to refining therefore, one must not neglect either very precise or more crude alternatives for determining fiber length, fiber-length distribution, and fines content. Therefore, various of the manual and semiautomatic microscopic methods for fiber-length measurements now in use can be very helpful. Classifier analysis is valuable also for certain routine control purposes, a simple grid test for fiber-length index developed by Dr. Ray deMontigny. We have used this latter test with a great deal of success in a number of studies of control correlation.

"I cannot overemphasize the point that undue attention upon relations between isolated properties is usually highly unproductive and, quite often, highly misleading."

Surface Area

Also of great importance to sheet properties, both in determining bonding potential and in fixing the ultimate strength and optical properties of a sheet are surface areas exhibited by the pulp. Actually, there are two different surface areas with which we must be concerned. One is the hydrodynamic external surface, which is that found in suspension and which largely determines the drainage of the stock on the machine. The other is the dry surface area of the fibers in the finished sheet. This area is much smaller than the first and may be subdivided into that part which is joined together in fiber-to-fiber bonds, known as the bonded area, and that which is not so joined, the so-called unbonded area. Optical properties, such as opacity, depend greatly on the absolute amount of this unbonded area.

The classical freeness test is the simplest estimate of hydrodynamic surface area. However, it is not at all a good test for surface in comparing pulps of different species and of different fiber characteristics. It is not at all good for either lightly beaten pulps or very heavily beaten pulps but it is useful in the intermediate range, especially if a fairly consistent stock is being processed. Nevertheless, one can be quite far off, especially on drainage properties, if one does not make a more precise determination than this freeness test. The filtration resistance test developed by Dr. W. L. Ingmanson or some of the related pad permeability methods give much more reliable indications both of behavior on the paper machine from a drainage standpoint and of the actual amount of hydrodynamic surface present in a beaten pulp. Such determinations have been found to be quite useful in machine design, because if made with sufficient precision, they may be correlated directly to the amount of drainage to be encountered on a table roll section and thus can be used to predict the wire length on the machine which is optimum for the type of product to be obtained.

The most convenient method of estimating the unbonded surface area in a finished sheet is from determination of specific scattering coefficient of monochromatic light using a device such as the General Electric recording spectrophotometer. The relation of the optically unbonded area so determined to the unbonded area determined by gas adsorption should be the same for all types of pulp. However, recent experience in a number of studies indicates that this is not always so. Further, a base line for the relation of the light scattering of a particular pulp to its gas adsorption surface area is not presently available from theoretical consideration. Therefore, determinations of bonded and unbonded area which are critical to certain optical properties and strength properties need to be performed by gas adsorption.

Swollen Specific Volume

Another wet pulp property of extreme importance is that of swollen specific volume. The Campbell effect alluded to above will operate most usefully on fibers if they are pliable or plastic. Generally, therefore, the greater the swelling of the fibers, either from chemical treatments or, more usually, from the mechanical action of the beaters, the greater the bonding that will be obtained in the finished sheet. This swelling of the fiber is truly what is referred to when the papermaker uses the term "hydration." However, this swelling is

not adequately measured by the freeness test, although there is necessarily a certain correlation between freeness and hydration. The filtration resistance technique and related permeability technique can determine swollen specific volume as well as external specific surface area. This is done with the aid of a separate measurement of the compressibility of a pad of fiber; such determinations are somewhat tedious, but if done rigorously are extremely valuable.

Reasonably accurate but theoretically somewhat unsound estimates of fiber swelling may be obtained by several of the centrifugal methods of water extraction. Any of these methods, the most recent of which are the Water-Retention Value technique of George Jayme and the Centrifugal Water-Retention test developed at the Institute, depend on applying a high centrifugal force to remove as much as possible of the free water between the fibers while retaining the water of swelling within the fibers. This, of course, really cannot work because the deformation of the fibers under the high centrifugal field squeezes some water out that is really water of swelling, whereas the surface tension forces in the voids between the fibers prevent expression of all of the interfiber water. However, the centrifuge test is reasonably quick, reasonably convenient, and requires little in the way of expensive equipment or highly trained technicians. In pulp evaluation studies both here and abroad in the past five years, it has been demonstrated to be extremely useful as an estimate of hydration and to correlate extremely well with paper properties. Our experience with this test is that it is more sensitive to changes in basic fiber characteristics and to changes in refining characteristics than is either the freeness test or a measure of fiber length and fines.

Relation of Tests to Sheet Properties

In evaluating the relation of wet pulp tests to finished sheet properties we must bear in mind that these properties are necessarily a compromise and involve at least two critical balances; one, the balance among the various properties of strength normally considered to exist in the plane of the sheet, such as tensile strength, burst and tear and the properties in the direction normal to the plane of the sheet, such as pick resistance, fold, and various evaluations of printability. The other balance involves various of these properties and optical properties such as opacity. Tensile strength, for example, is primarily affected by the individual fiber strength of the beaten fibers, fiber length, some factor involving bonding (which includes both bonded area and strength of bonds within the bonded area) and then an important formation or orientation factor, as previously discussed. Fines, for example, may contribute relatively little to normal tensile strength but may have a very great effect on the tensile strength of a sheet in the direction perpendicular to the plane of the sheet, and therefore may make a very great difference in the pick resistance of a base sheet. As previously indicated, they will also make a very great difference in some properties, such as the fold.

" . . . a large proportion of the fibers in a sheet of paper actually do rupture in the course of a tensile break."

In determining the balance among these properties, the external specific surface (that is, the wet specific surface area) may play a very important role. Of itself, the hydrodynamic specific surface does not appear to be particularly important in any of these sheet properties, but the relative amount of surface found in fines and found in the "whole fibers" is particularly important. Likewise the balance of strength properties and opacity may be quite disconcerting. Development of a high amount of bonded area will give a sheet with good pick resistance and with high tensile strength, will probably yield inferior tear, and will also probably yield inferior opacity. A good change in cooking or bleaching conditions may produce a pulp with greater bonding strength per unit bonded area. Such change will mean that less beating is required to obtain a given level of tensile. This lesser amount of beating may produce a lesser amount of ultimate bonded area in a sheet and so will give improved opacity. This is but an example of why it is necessary to go back and look at the various basic properties when deciding what balance to achieve between refining, and the chemical properties of a pulp that determine its response to refining.

Relation of Tests to Refining Operations

We conclude with some very brief comments on the relation of both wet pulp tests and paper sheet tests to beater and refiner operations. We must look at this from the broad view of the entire system. Several studies made recently lead me to believe that the specific action of any particular type of beating engine is usually not so critical that it cannot be counterbalanced by appropriate changes, either in the pulp variables or in the paper-machine variables. There are fairly strong indications that if you can achieve a certain balance of wet pulp tests, namely fiber length, distribution of surface area of fines and fibers in the proper proportion, and degree of swelling of the pulp, it really doesn't matter too much what type of equipment was used to obtain these properties. It is, of course, true that some types of equipment will develop one or another of these properties more rapidly and more efficiently in specific types of pulp. We are all familiar with the effect changes in alloy composition and bar width have on the performance of common bar-to-bar refiners as regards the hydration and cutting of a given type of pulp.

It is often easier to change your pulp than it is to change your refiner, considering the very high investment in the refiner. In installing new equipment, one should attempt to "tailor-make" the equipment installation to the available run of fiber and the desired type of product. However, it is not necessary to throw out a servicable piece of equipment when product requirements change. Application of a battery of pulp tests and of paper tests as part of a refiner evaluation study can be quite productive of broad interpretation of the possibilities of the refiner. I very strongly urge conducting statistically designed experiments in this realm.

By use of a battery of tests-method and multiple-correlation techniques, one can quite rapidly isolate: (a) the main effects on properties obtained from the action of the refiner, that is, if comparisons are being made of refiners; and (b) the importance of the contribution of the refiner, its power setting, etc., to the properties in the finished sheet. Quite often such a study will show that there are many ways in which the desired product may be obtained.

MAINTENANCE SERIES
NUMBER 21

Six Basic Rules Still Exist In Caring For Today's Chipper

These concern: sharp and properly adjusted knives and bed knives; unobstructed spout; wear plates on the spout and disk; thrust bearing adjustment; proper lubrication.

N. P. Wardwell,
President,
Carthage Machine Co.,
Carthage, N. Y.

The maintenance of a chipper has changed in detail as the design has changed through the years. But elementary precautions which must be taken to keep slivers and sawdust at a minimum, are just as important today as they were 50 years ago. If the maintenance department neglects these rules, the new improvements, which have very decidedly increased the chipper's ability to make uniform chips with lower sawdust content, can be nullified.

Six Old Rules

These old rules are as follows:

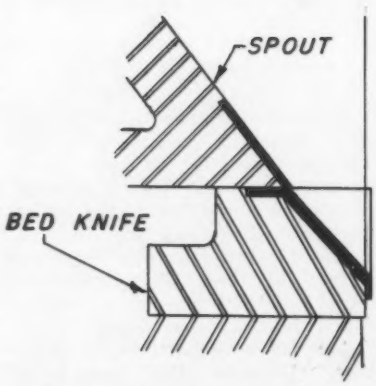
1. Keep the disk knives sharp.* Dull knives make sawdust. We have also seen slivers which were caused by other bad conditions, strikingly reduced when sharp knives were put in.

2. Keep the disk knife edges close to the bed knife. This is the most common maintenance fault. The knives should have not more than 1/32 inches clearance from the bed knife and preferably 1/64 inches. Sometimes foreign matter gets under the knife holders to make one or more knives stick out beyond the others. This condition should be corrected as soon as possible, so that the close clearance can be had by all knives.

3. The bed knife should be kept sharp. It can be built up and ground sharp. Newer designs make it easier to change these bed knives so that maintenance can afford to do it frequently. A weekly change is recommended. A spare bed knife is furnished with each chipper for this purpose.

When the edge is rounded too much, perhaps between 1/16 inch and 1/8 inch radius, the bottom fibers of a log tend to bend down around the rounded edge instead of being cut. They form what we call "ribbons" which are sometimes quite long. They never go through the disk, but drop down between the disk and bed knife. They are also sometimes formed by lack of close clearance of disk knife and bed knife as described in paragraph 2. We have a slow motion movie that shows this point very vividly.

4. There should be no obstruction to the passage of logs down to the bed knife cutting edge. (See sketch). Sometimes the floor of the spout gets worn enough so that the horizontal top surface of the bed knife is exposed and forms a ledge. Logs can catch on this ledge and tip up forming slivers or at least oversize chips.



Sketch to show the correct position of bed knife relative to the floor of the spout. Darkened areas indicate surfacing material welded on to reduce wear.

Reducing Spout Wear

The floor of our spouts have strips of hard surfacing material welded on to reduce this wear. Also the bed knife cutting edge is higher than a straight line down the spout as shown in sketch. In other words if a straight edge is laid on the floor of the spout, it will touch only at its upper end and on the bed knife edge. This reduces the wear on the spout and makes the bed knife edge bite into the log more effectively.

(Continued on page 50)

*Proper use and grinding of chipper knives will be discussed in a subsequent article in this maintenance series.

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- ☐ **How precise is the machining?**
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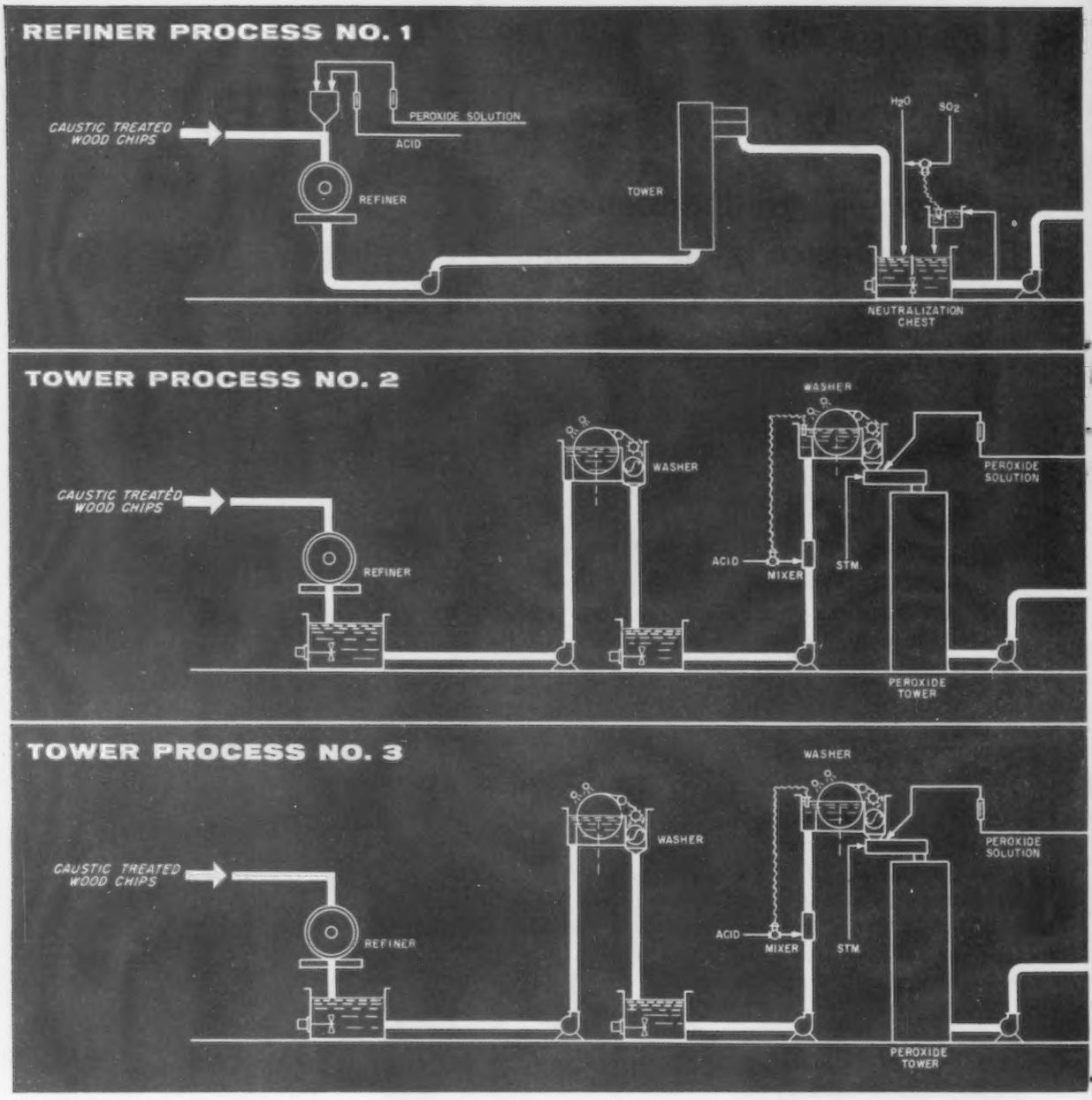

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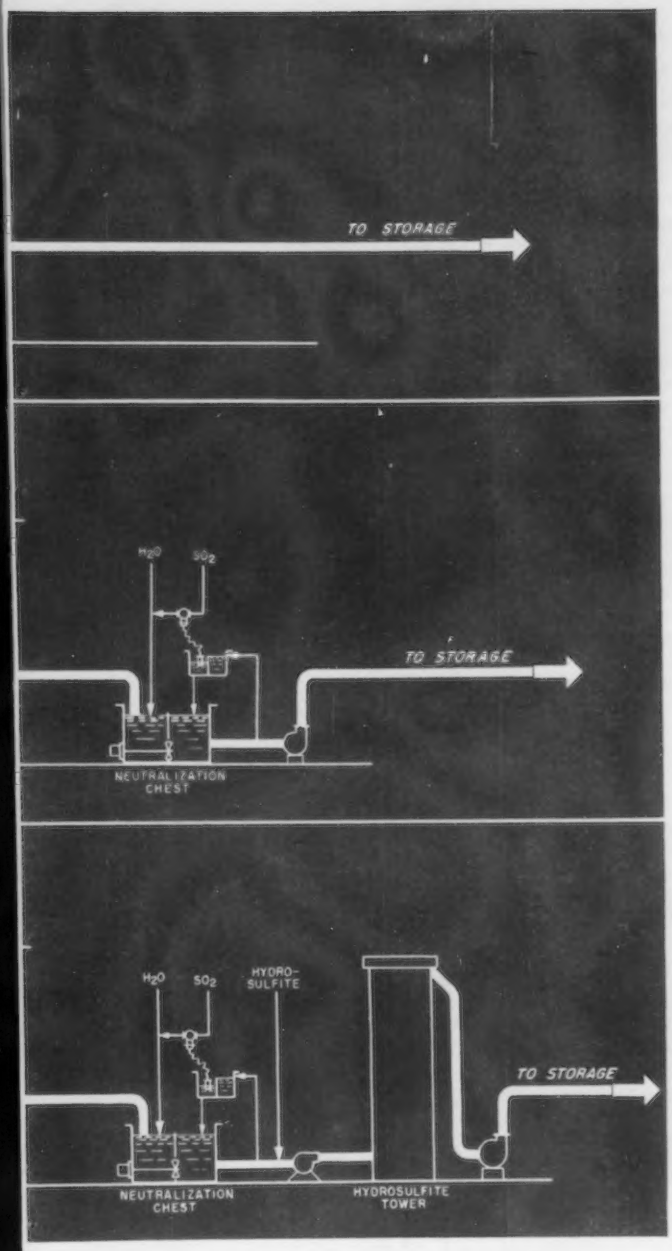

Du Pont experience has helped many mills make the right choice between tower or refiner bleaching for cold caustic pulp based on brightness requirements. For example:

60 brightness. In process No. 1 at left, caustic-treated wood chips enter refiner and are bleached with "Albone" hydrogen peroxide and acid*. The use of acid controls the alkalinity of the bleaching reaction and assures maximum response from the hydrogen peroxide. Sulfur dioxide (SO_2) then neutralizes the bleached pulp and stabilizes the brightness obtained in the refiner. **Du Pont Patent Pending.*

65 to 75 brightness. In process No. 2 at left, pulp is refined, washed to remove caustic solubles, acidified with sulfuric acid to remove acid solubles, washed, and bleached in a conventional peroxide tower to desired brightness in the 65 to 75 range.

70 to 80 brightness. In process No. 3 at left, pulp goes through the same steps as in process No. 2. Then pulp is neutralized, and bleaching is completed in a hydrosulfite tower for maximum brightness in the 70 to 80 range.

Electrochemicals Department, Peroxygen Products Division
Wilmington 98, Delaware

ALBONE® hydrogen peroxide — DU PONT — **SOLOZONE®** sodium peroxide

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C. R. Lombard, New York, N. Y.—LOngacre 3-6440

Southern Area
R. W. Hammond, Charlotte, N. C.—FRanklin 5-5561

Or call: N. J. Stalter, Wilmington, Delaware—PRospect 4-4698

If the spout floor becomes worn, it can be built up again. The hard strips can also be built up and blended in to the parent metal at the top.

When this is done templates furnished by the factory should be used to check the repaired contour and also the contour of the bed knife's sloping recess. This should also be done with the bed knife whenever it is built up and ground to give assurance that a straight edge placed on the spout floor will lie as described above.

Sometimes the bed knife seats become worn unevenly so that the bed knife rocks. Liner plates underneath and behind the bed knife can be replaced when this trouble occurs. This trouble can be minimized by keeping the two cap screws tight that hold the bed knife horizontally against its seat, and by keeping the spout clamped down hard on the bed knife top.

5. The surface against which the logs rub on the disk may become worn. It wears more slowly on the Norman chipper than on others. When these surfaces are worn, longer chips are cut. If some spots are worn more than others, longer chips are found in just those places.

Wear Plates on the Disk

The wear is more concentrated just opposite each knife. In some models we have removable plates rectangular in shape set into these critical areas. These plates should never be higher than the surface into which they are laid. So we make them a little thin and use shims to bring them just even with the main wearing surface.

The area back of these especially critical ones is protected by strips of hard surfacing material. When worn sufficiently they can be repaired by the factory.

In other models the wearing plates are pie shaped. We recommend a type we make with hard surfacing material. Sometimes they can be repaired when worn through the hard surface.

If the hard surface is damaged by foreign material, the mill can usually repair in their own maintenance department. If it wears off, they should be returned to the factory.

6. The thrust bearing clearance must be kept up within the limits prescribed in the instructions. This helps to keep close clearance with the bed knife by keeping the end play at a minimum. The tapered sleeve between the shaft and the inner race should be tightened by the lock nut provided for that purpose until a feeler gauge between the top roller and the outer race shows the correct clearance.

Grease should be changed every six months.

These two precautions are preventive maintenance. Neglect of them might result in a scored shaft that would have to be replaced.

See Field Service Man

There are many other details that could be added to the above. But we feel that they can be best handled by consulting manufacturer's representatives or field service men. We urge that you talk over your problems with these men when they call and give them the opportunity to look over your chipper. Many times they can make suggestions that will be most helpful in making it possible for your chipper to produce to the best of its designed ability.

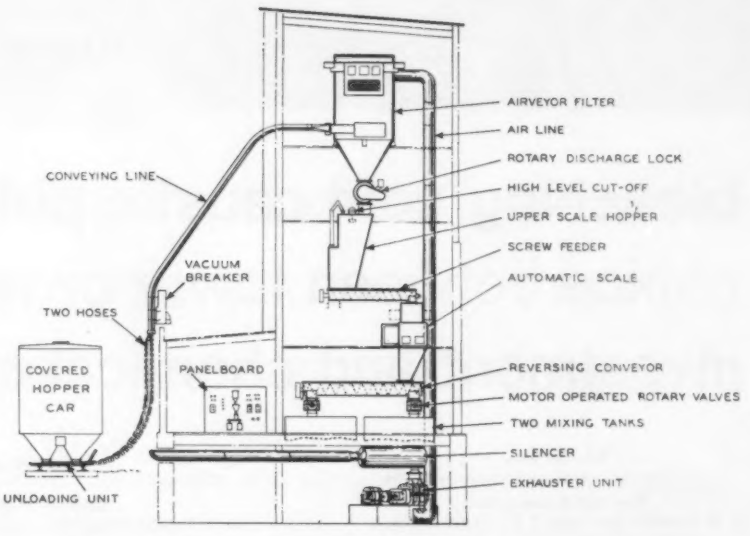
Clay Handling Time Cut

65 Per Cent at Johnsonburg

Until recently clay was received at the Johnsonburg mill of New York & Pennsylvania Co. in bags. It took four men a full day to unload one car of six hundred 100-lb. bags. Increased demand for clay became greater than manual clay handling reasonably could meet. Therefore, an automatic system was built into a recently completed clay preparation tower which enables one man at a master control to unload 25 tons of bulk clay an hour.

This new tower was built alongside a railroad siding (see drawing). Covered hopper cars, holding 50 tons of clay divided into two sections, pull up adjacent to this tower. Then a dual-feed unloader is attached to the enterprise gates at the bottom of the car. Then, after hooking up air and conveying line hoses to the car and the unit, and opening the car outlets, the operator starts a blower.

Material drops by gravity through the two gates directly into the unloader and then into a pneumatic vacuum system (Fuller & Co.) which sucks the clay 50 ft. up to a filter on the top floor of the preparation building. The filter separates the clay from the conveying air, which is piped to an exhauster to provide both the activating air and the vacuum for the entire system. Power requirement for the exhauster is 100 h.p.



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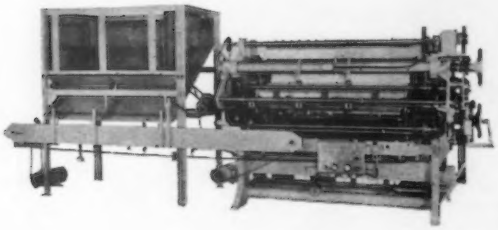

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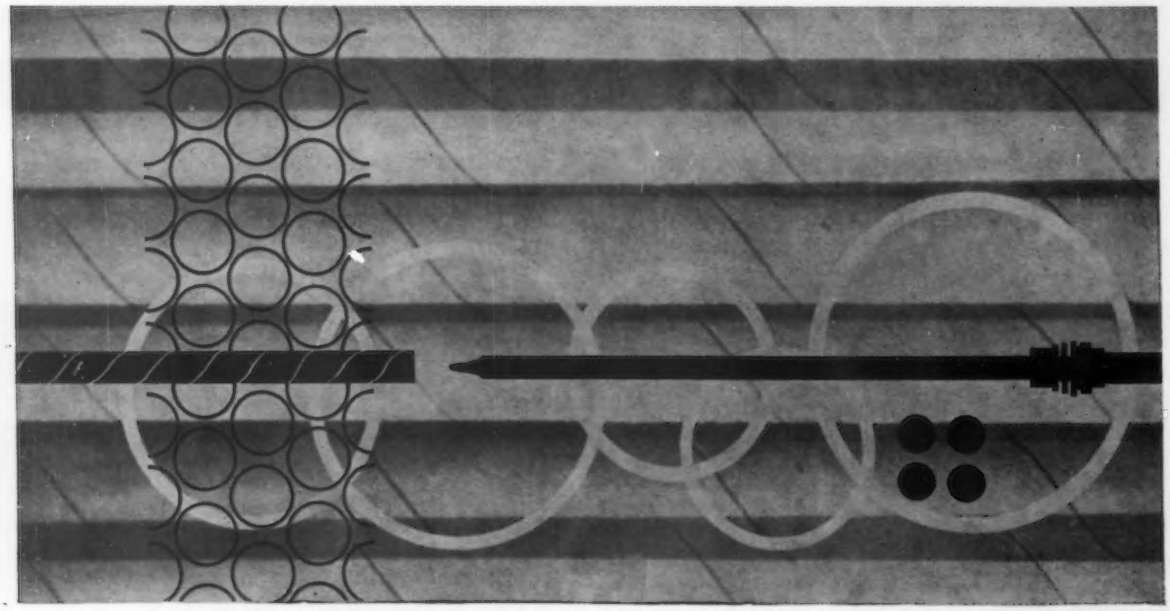

Research on Chemi-Mechanical Pulps From Various Softwoods & Hardwoods

The results of experiments on the making of high-yield chemi-mechanical pulps from hardwoods and softwoods by several cooking techniques are discussed. Chemi-mechanical pulps are defined in this report as pulps produced from wood in any form or shape by using a mild chemical treatment in which there is no major change in the lignin, followed by a mechanical treatment to separate the fibers. Usually these pulps fall within the yield range of 80-95 per cent. In one method of neutral sulphite chemi-mechanical pulping a conventional procedure was followed, while in another method a hot-liquor impregnation procedure was followed. Another chemi-mechanical pulp was made using a two-stage acid-alkaline process. Aspen, western hemlock, and a mixture of hardwoods were pulped by the conventional neutral sulphite chemi-mechanical method at yields ranging from 87 to 92 per cent. Balsam fir and western hemlock were impregnated and cooked with a preheated neutral sulphite liquor to yields ranging from 90 to 97 per cent. Western hemlock was also pulped by the two-stage acid-alkaline chemi-mechanical process. The effect of varying the pH of the cooking liquors by the use of various buffers was determined.

Two cooking techniques were used to make the high-yield neutral sulphite chemi-mechanical pulps. In one method a conventional procedure was followed; that is, presteaming, liquor addition, gradual temperature rise, and a time at maximum temperature followed by blowdown. To obtain high yields of pulp by this method, less chemical was dissolved in the cooking liquor than for normal semi-chemical pulping, and the maximum cooking temperature was reduced to between 130° and 140° C. These temperatures were comparable to those recommended for securing bright pulps by the chemi-groundwood process.

Hot-liquor impregnation cooks were made by heating the neutral sulphite liquor in a pressure reservoir connected to the digester, before introducing it to the chips. During the impregnation periods, which lasted from 10 to 40 minutes, a hydrostatic pressure of 100 pounds per square inch gage was maintained in the digester. Preheating the impregnating solution to temperatures between 170° and 190° C. produced equilibrium temperatures in the digester of from 125° to 135° C. At the end of the impregnation, the liquor was blown back into a reservoir.

To make the two-stage acid-alkaline chemi-mechanical pulp, the chips were presteamed followed by an evacuation of the digester to about 20 inches of mercury. A sodium bisulphite liquor at room temperature was then added, followed by the injection of liquid sulphur dioxide. The temperature was raised to 114° C., where it was held for 35 minutes. After blowdown, the treated chips were passed through a screw press and then returned to the digester, where they were at atmospheric pressure for 3 hours, in a solution of sodium bicarbonate.

Impregnation-Type Cooks

From the standpoint of pulp color and brightness, hot-impregnation sodium sulphite treatments, using sodium bisulphite as the buffer, were found to be more satisfactory than those buffered with either sodium carbonate or bicarbonate in producing high-yield pulps from balsam fir.

Lowering the pH from 10.4 to 7.6 during a series of 10-minute treatments at 135° C. increased the brightness of the pulp from 47.6 to 52.5 per cent, and decreased the yellow cast noticeably without significantly affecting pulp strength. The highest yield of pulp was produced when the pH value was the lowest, and the lowest yield of pulp was produced when the pH value was highest.

From Report No. 2188 by G. H. Chidester, chief, Division of Pulp and Paper; J. F. Laundrie, chemical engineer; and E. L. Keller, chemical engineer, Forest Products Laboratory, Forest Service, U. S. Department of Agriculture, Madison, Wis.

Opacity

High opacity was obtained in aspen and mixed hardwood pulps produced in yields above 90 per cent by the neutral sulphite, and bisulphite chemi-mechanical, and the groundwood processes. Aspen cold soda and chemi-groundwood pulps of 88 and 89 per cent yield, respectively, were relatively low.

Regardless of yield, the balsam fir and western hemlock neutral sulphite, cold soda, and bisulphite chemi-mechanical pulps were low in opacity. The two-stage acid-alkaline chemi-mechanical pulp also had a low opacity, about the same as the commercial western hemlock sulphite pulp. The only exception to this was a western hemlock neutral sulphite chemi-mechanical pulp of 93 per cent yield, which had an opacity of 91 per cent. Western hemlock groundwood pulp had an opacity of 95 per cent and, though not available, the opacity of the balsam fir groundwood could be expected to be similarly high.

The opacity of pulp is influenced by its brightness and also by the fiber characteristics and size distribution. Pulps in this yield range that have high opacity are often low in brightness.

Brightness

Pulps made in this yield range by mild chemical treatment are generally low in brightness regardless of the method of preparation. At yields above 90 per cent, the brightness of aspen neutral sulphite, cold soda, and chemi-groundwood chemi-mechanical pulps are fairly comparable to the brightness of unbleached groundwood pulps from aspen and the softwoods. The brightness of all the aspen pulps below 90 per cent yield is less than that of the groundwood pulps. The brightness of the mixed hardwood pulps, regardless of yield or process, is also less than the brightness of the aspen and softwood-groundwood pulps.

Of the softwood pulps, only the balsam fir chemi-groundwood pulp

was relatively close to the softwood-groundwood pulps in brightness. These softwood high-yield pulps that could, because of their strength, be considered as partial substitutes for unbleached sulphite pulp were as good as, or better than, the spruce and western hemlock sulphite pulps in brightness. If bleaching invariably reduces opacity, so the pulps with high initial opacity are most likely to have the advantage for bleaching treatments. Although the yellowness of the various pulps produced was not measured quantitatively, it was observed visually that the cold soda pulps, even after bleaching, had more of a yellow cast than any of the other pulps.

Strength

The association of higher strength with lower yield was noticeable in even the narrow range of 88 to 92 per cent yield for both the neutral sulphite and cold soda chemi-mechanical pulps. At the same yield levels, the hardwood cold soda pulps had better strength than the hardwood neutral sulphite and hardwood bisulphite pulps. The aspen chemi-groundwood pulps were stronger than the aspen neutral sulphite and cold soda pulps at the same yield and freeness levels. Both the aspen and mixed hardwood cold soda pulps at 92 per cent yield were comparable to softwood groundwoods in strength.

The balsam fir bisulphite, the neutral sulphite, and the chemi-groundwood chemi-mechanical pulps made at 90, 91, and 97 per cent yields, respectively, were comparable in strength. However, the freeness of the chemi-groundwood was very much lower than the other two. The balsam fir cold soda pulp was similar to balsam fir groundwood pulp in strength.

The most noticeably comparable strength value between certain of the softwood high-yield pulps and the acid sulphite pulps made from the respective species was their tear factor. The tearing strength of the balsam fir bisulphite pulp was higher than that of the spruce sulphite pulp, and the neutral sulphite pulps (at 91 and 92 per cent yield) were almost as high. Similarly comparable tear values are noted for the western hemlock neutral sulphite, two-stage acid alkaline and sulphite pulps.

Density

The aspen neutral sulphite, cold soda, and chemi-groundwood chemi-mechanical pulps all had density values much higher than either the aspen or softwood groundwoods. The only exception to this was a neutral sulphite pulp made at 92 per cent yield, which had a density value only slightly higher than the groundwoods.

It appears that, to produce pulps by the neutral sulphite process from the mixed hardwoods that have density values comparable to those of the groundwoods, the yield must be near 90 per cent, whereas pulps made by the cold soda process must be greater than 92 per cent in yield. A pulp made from the mixed hardwoods by the bisulphite process at 90 per cent yield had a density value actually less than those of the groundwoods. The softwood chemi-mechanical pulps, regardless of process or yield, all had density values similar to those of the groundwoods.

Freeness

Hardwood pulps produced by mild chemical treatments with strength and fiber-distribution properties satisfactory for groundwood pulp substitution are generally much freer than the groundwood pulps. On the other hand, if these pulps are strong enough for substitution for softwood sulphite pulp, they are usually lower in freeness than the sulphite pulp.

Energy Consumption

Most of the chemi-mechanical pulps can be prepared for groundwood pulp substitution with about the same or even less energy consumption than that required for making groundwood pulp. With respect to aspen, the neutral sulphite pulps appear, to require somewhat more energy than the cold soda and chemi-groundwood pulps at the same yield or the same freeness levels. Energy consumptions for refining the softwood pulps are generally moderate regardless of process.

Pulping and Papermaking Experiments On Colorado Aspen

Quaking aspen from Colorado was pulped at the Forest Products Laboratory by the groundwood, sulphite, neutral sulphite semichemical, and kraft processes. Magazine coating-base papers were made with the groundwood and kraft pulps in the furnish. The results show that aspen grown in this locality is equivalent to that grown in the Lake States for pulp and paper manufacture.

Aspen and cottonwood are plentiful in the Southern Rocky Mountain area but have not been used as sources of pulpwood, even though these same species are widely used for this purpose in the Lake States. This abundance of aspen and cottonwood in the Southern Rockies is shown by the net volume of about 3.12 million board feet of live saw timber on commercial forest lands alone, or nearly 80 per cent of the volume in the Lake States. In Colorado and New Mexico the total volume of these woods is about 2.58 million board feet. The wood of these species grown in the Rocky Mountain area is probably as suitable for papermaking as that grown in the Lake States, but there is a possibility that some physiological differences attributable to locality of growth could affect their usefulness.

The experiments show aspen from Colorado as represented by the samples used will produce about the same quality of groundwood pulp as aspen from the Lake States.

Sulphite and NSSC

After beating, and compared at the same freeness, the Colorado aspen sulphite pulp was higher than the Lake States pulp in all strength properties; in some properties the difference was appreciable. The brightness of the unbleached Colorado aspen pulp was also higher than that of the Lake States pulp though the reason may be attributed to the fact that the latter had been processed before making the brightness determination.

Conclusions

Quaking aspen grown in Colorado and other localities in the Southwest is a satisfactory wood for the production of pulp and paper. The sulphite pulp was stronger than a comparable pulp made from Lake States aspen. Pulps made by the other processes were practically equivalent to those made from Lake States aspen.

From Report No. 2180 by Axel Hyttinen, chemical engineer; J. Stanley Martin, chemical engineer; and Eugene L. Keller, chemical engineer, Forest Products Laboratory, Forest Service, U. S. Department of Agriculture, Madison, Wis.

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Kraft, Blchd.	‡152.00/160.00				§157.50/ —
Kraft, Blchd. Hdwd.	152.00/ —		140.00/ —		
Kraft, Semi-bleached.	140.00/145.00				
Kraft, Unbl.	117.50/125.00	125.00/130.00	†125.00/130.00	125.00/ —	
Sulphite, Blchd.	‡150.00/155.00	‡150.00/155.00	*155.00/ —	*155.00/ —	155.00/ —
Sulphite, Bl. Hdwd.	150.00/ —				
Sulphite, Unblchd.	135.00/ —	135.00/ —	†135.00/ —	*135.00/ —	
Sulphite, Unb'l, Gl'sn		140.00/ —	†134.00/ —		
Soda, Blchd.	147.00/150.00	150.00/ —			

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4	7.00/6.25	7.25/6.25	6.50/6.25	7.75/ —
5	6.25/5.75	6.00/5.50	6.00/5.50	7.50/7.00
6	5.75/4.75	5.25/5.00	5.25/5.00	6.50/4.50
7	4.75/4.25	4.50/4.00	4.75/4.00	4.25/4.00

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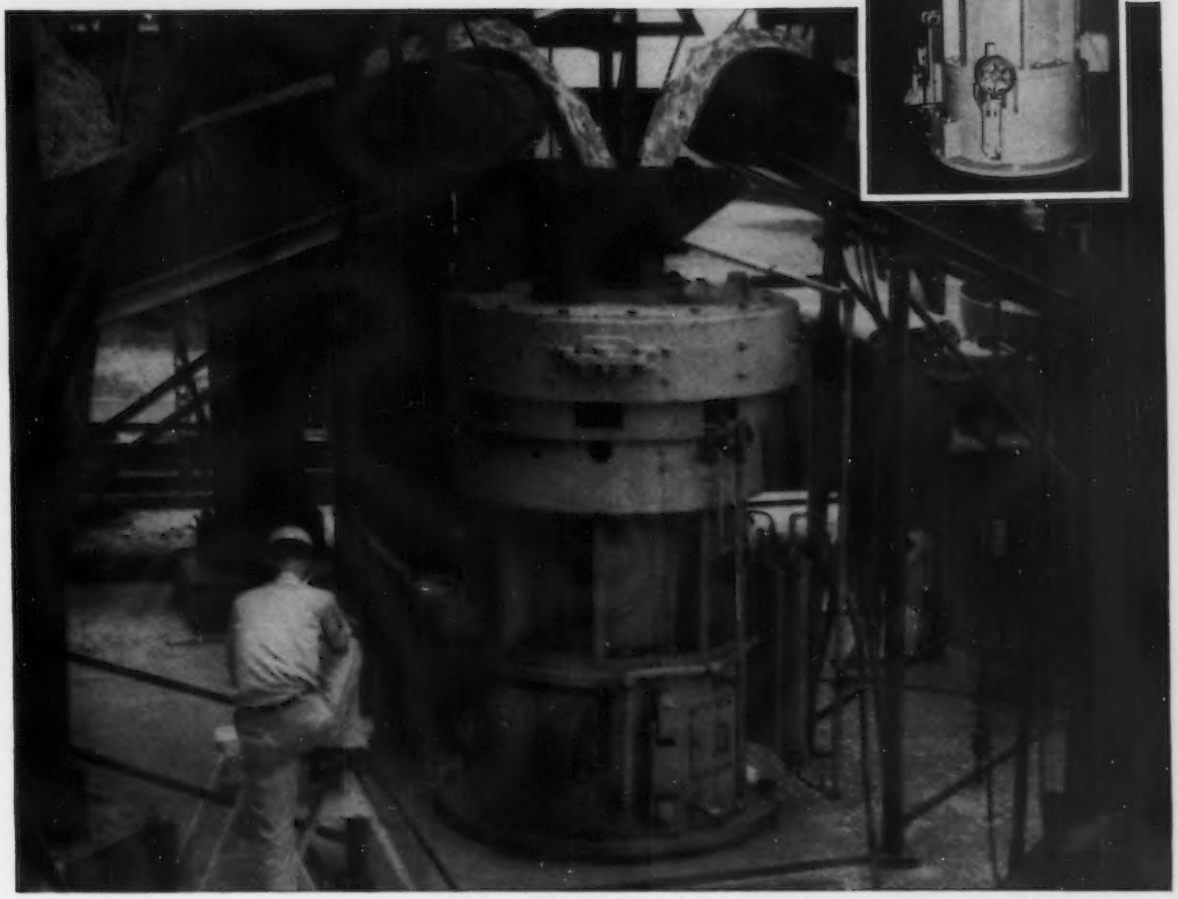
	New York	Boston	Chicago	Los Angeles
	July 11	July 11	July	July
No. 1 Mixed Paper	$ 7.00/ 9.00	9.00/ 11.00	6.00/ —	11.00/ 13.00
No. 1 News	12.00/ 13.00	12.00/ 13.00	13.00/ —	12.00/ —
Overissue News (Lg. size)	11.00/ 13.00	11.00/ 13.00	18.00/ —	18.00/ 19.00
Mill Wrappers	19.00/ 22.00	13.00/ 15.00	9.00/ —	12.00/ 14.00
Old Corrugated Containers	22.00/ 23.00	19.50/ 20.00	20.00/ —	23.00/ —
Super Resorted Kraft Paper	35.00/ 40.00	— / —	30.00/ —	55.00/ —
New Double Kr. Ld. Corr. Cuts	32.50/ 35.00	35.00/ —	35.00/ —	35.00/ —
(Semi-chem. medium)	47.50/ —	47.50/ —	45.00/ —	— / —
New 100% Kraft Corr. Cuts	40.00/ 42.50	— / —	57.50/ —	— / —
New Br. Kraft, Env. Cuts	70.00/ 75.00	70.00/ 75.00	52.50/ —	60.00/ —
New Br. Kr. Bag Waste Prntd.	55.00/ 60.00	55.00/ 60.00	52.50/ —	55.00/ —
New Br. Kr. Bag Waste Unprintd.	60.00/ 65.00	65.00/ 75.00	60.00/ —	60.00/ —
No. 1 Groundwood Shvs.	25.00/ 30.00	25.00/ 30.00	17.00/ —	32.50/ 35.00
White Newsblanks	47.50/ 52.50	47.50/ 52.50	35.00/ —	55.00/ —
No. 1 Soft White Shvs.	60.00/ 65.00	57.50/ 60.00	60.00/ —	70.00/ 75.00
Super Soft White Shvs.	65.00/ 75.00	75.00/ 85.00	70.00/ —	— / —
Hd. White Shvs.	85.00/ 90.00	90.00/100.00	85.00/ —	85.00/ 95.00
Hd. White nv. Cuts	100.00/105.00	105.00/110.00	90.00/ —	110.00/113.00
Col. Tab. Cards	42.50/ 45.00	42.50/ 45.00	45.00/ —	40.00/ 45.00
Manila Tab. Cards	62.50/ 65.00	62.50/ 65.00	65.00/ —	70.00/ —
No. 1 Col. Ledger	35.00/ 40.00	35.00/ 40.00	40.00/ —	27.00/ 29.50
White Ledger	48.50/ 52.50	50.00/ 55.00	50.00/ —	50.00/ 55.00
Mixed Book & Mag.†		— / —	12.50/ —	— / —
No. 1 Books§	16.50/ 19.00	14.50/ 16.50	27.50/ —	13.50/ 14.00

† Includes Time & Life; no coarse groundwood. § Not to exceed 10% of groundwood.

For primary refining at low power...

New Jones Vertiflex



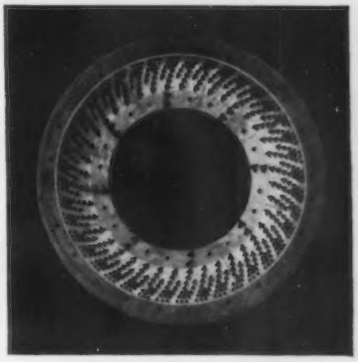
Vertiflex requires minimum floor space. Available in two disc sizes — 48" (shown here) and 34".

Typical application..... Chip Shredding

High quality pulp with extremely low waste and fibre damage, substantial savings in alkali used, increased yield, decreased screen rejects and lower recovery system loading — those are the results from this efficient Jones Vertiflex chip shredding installation. And energy required to process more than 2000 B.D. tons per day is just over ¼ HP days per ton!

Full size chips are fed to the Vertiflex by belt conveyors from two chip silos. Resulting "shreds" are as long as the original chips, but greatly reduced in cross section.

Other applications on which the Jones Vertiflex will perform with outstanding efficiency include cold caustic chips, high yield pulps, bagasse, high density bleaching and denoodling. For full details write to E. D. Jones Corporation, Pittsfield, Mass.



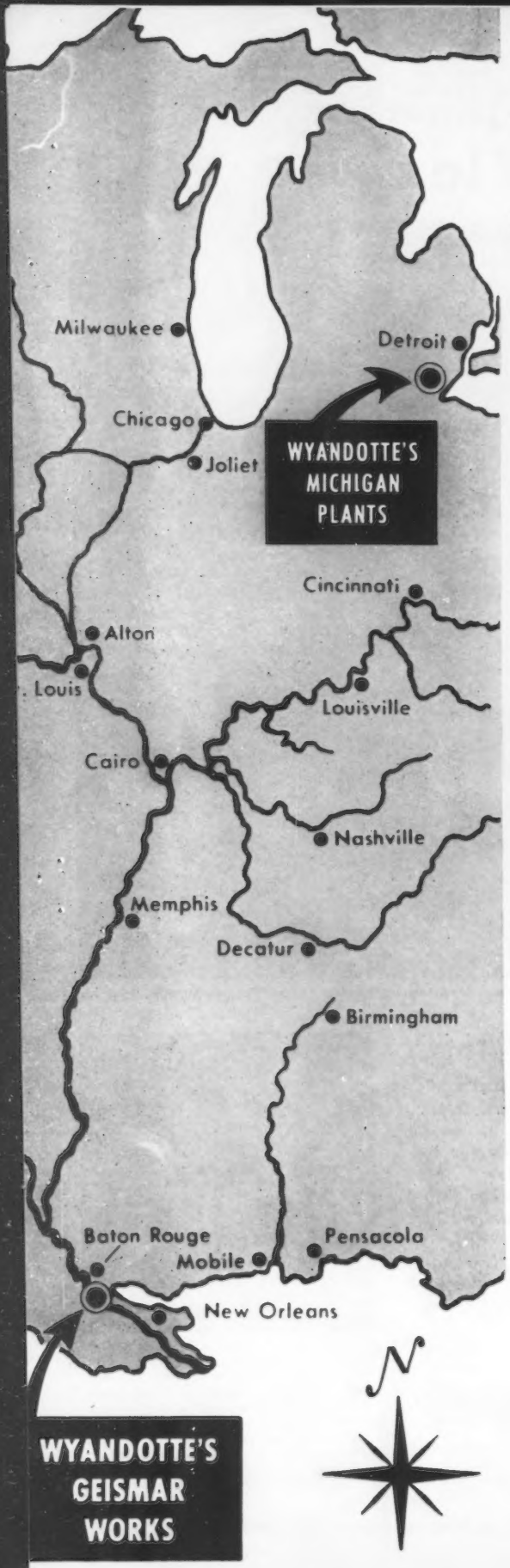
Teeth in vertically mounted rotating disc inter-mesh with teeth in opposing stationary plate mounted in Vertiflex cover. Clearance is easily adjustable and disc life is high since there is never any metal-to-metal contact. Teeth shape and arrangements are varied to fit the application.

E. D. JONES CORP. · PITTSFIELD, MASS. · member BELOIT group

Jones

PULP MILL EQUIPMENT AND STOCK PREPARATION MACHINERY

Represented in Canada by
The Alexander Fleck Ltd.
75 Spencer Street, Ottawa



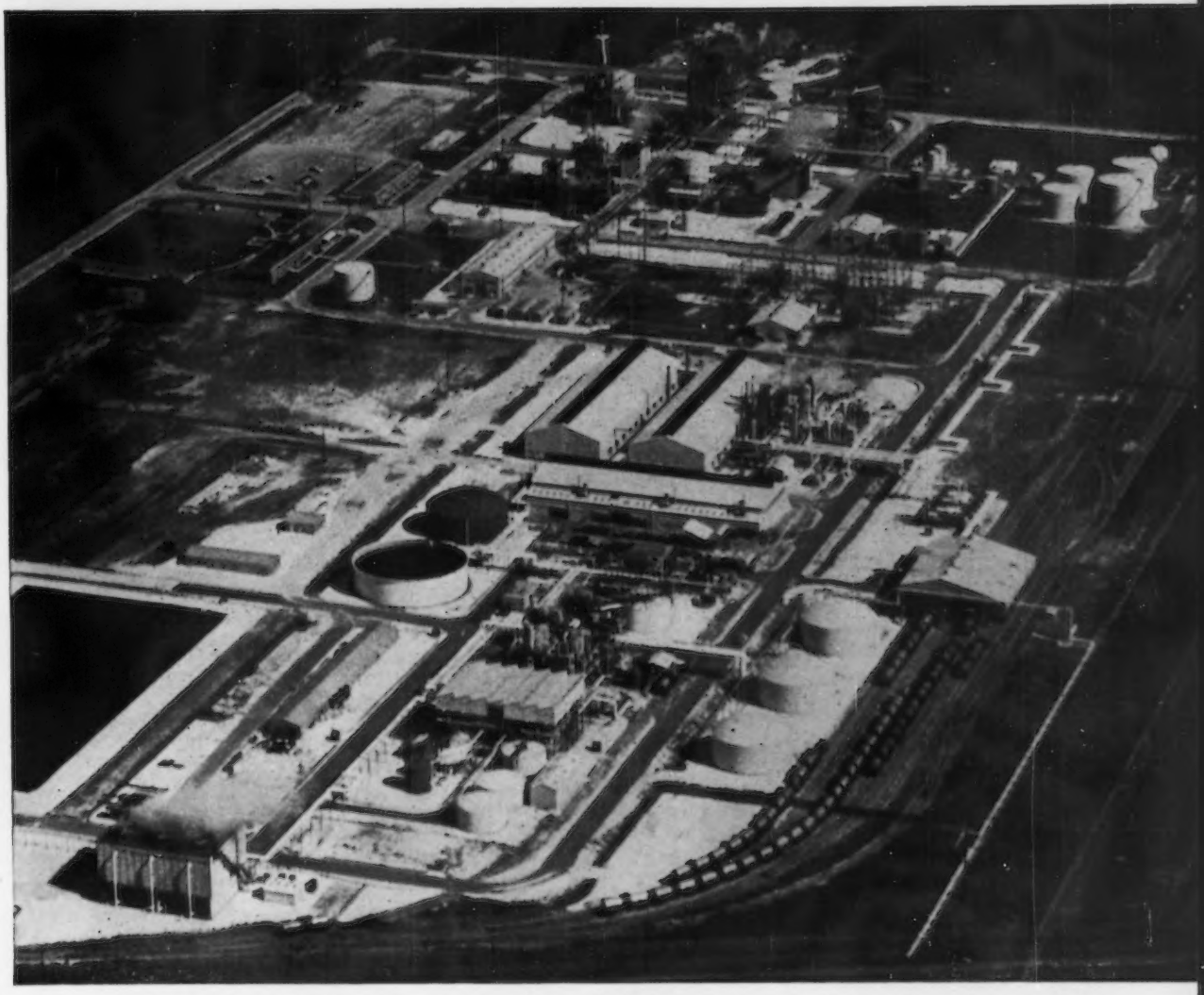
Something

Wyandotte's decision to produce chlorine and caustic in the South, as well as in the North, is proving its worth to a growing number of users of these two key chemicals. Can you benefit?

May we direct your attention to the map at the left? It illustrates an important point about our two chlorine-caustic plants. *Both are on major waterways.*

At Geismar, in the South, we are on the Mississippi . . . and close to the Gulf. At Wyandotte, in the North, we have direct access to the Great Lakes and the St. Lawrence Seaway.

Add to this the fact that railways and highways also go out from these two plants to four-fifths of the



Aerial view shows Wyandotte's new, modern Geismar Works immediately south of Baton Rouge, Louisiana. The chlorine-caustic facility is in the foreground. Ethylene oxide and ethylene glycol facilities are in the background.

ventured . . . something gained

productive capacity of the U. S. and Canada, and you see quite readily why more and more users of chlorine and caustic are taking advantage of our ability to ship economically and with dispatch . . . by barge or ocean tanker, truck or tank car. Can you benefit? We'd like to discuss the possibilities with you. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

Wyandotte CHEMICALS

MICHIGAN ALKALI DIVISION

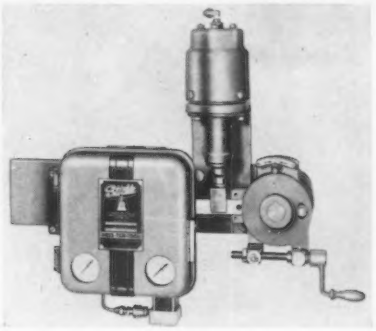
Pacing progress with creative chemistry®

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA • CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE • MURIATIC ACID • HYDROGEN • DRY ICE
GLYCOLS • SYNTHETIC DETERGENTS • SODIUM CMC • ETHYLENE OXIDE • ETHYLENE DICHLORIDE • POLYETHYLENE GLYCOLS • PROPYLENE OXIDE
PROPYLENE DICHLORIDE • POLYPROPYLENE GLYCOLS • DICHLORODIMETHYLHYDANTOIN • CHLORINATED SOLVENTS • OTHER ORGANIC AND INORGANIC CHEMICALS

NEW EQUIPMENT & SUPPLIES

Better Moisture Control For All Basis Weights

More accurate moisture control is promised by a new detector with adjustable sensitivity for any weight



of paper—from .0003 to the heaviest board.

Known as Model 300-F Moisture Detector, it is offered by Stickle Steam Specialties Co., 2215 Valley Ave., Indianapolis 18, Ind. The detector is designed for use with an Stickle Pres-Ten-Trol system to control moisture content automatically during paper drying.

A numbered dial on the detector permits quick setting of any desired sensitivity, while a proportional band prevents over-regulation. On machines running a wide range of basis weights, the best setting for each weight is quickly obtained. An identical setting may be accurately duplicated whenever the same weight is run again.

Furane Plastic Pipe Suited for Corrosive Liquids

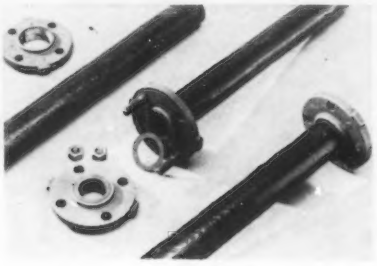
A line of easy-to-install reinforced furane plastic pipe particularly suited for use in the processing and transferring of acids, alkalis, and solvents is announced by Cornelius A. Rauh & Associates, Inc.

Called Eonite, the chemical-resistant pipe is strong, dimensionally stable and can carry, without distortion or deterioration, hot corrosive liquids and gases at temperatures up to 300° F., at pressures up to 150 p.s.i.g. Due to streamlined design, smooth bore, and its hydrophobic property, Eonite permits increased flow rates (to as much as 20 per cent greater than steel pipe of the same size) it is reported.

Having no chemical reaction with the material carried and thus preventing product contamination, Eonite pipe helps safeguard purity and quality control standards. It may be sanitized easily by either steam or chemical sterilization, and is immune to fungus or bacterial attack. In addition, Eonite pipe withstands weathering and does not deteriorate with age, the long-established firm reports. Physical and chemical properties are unimpaired by sunlight, moisture, and outdoor atmospheric conditions.

Ease of installation is a feature. Eonite pipe does not soften or sag with heat, thus requiring support only for pipeline weight. It is designed for leak-proof field assembly with the patented Rauh Ring Lock Joint, which includes two cast iron standard A. S. A. flanges, two 4° tapered rings, and a hard asbestos gasket impregnated with neoprene and graphite.

Being a simple mechanical device, no cements, solvents, threading,

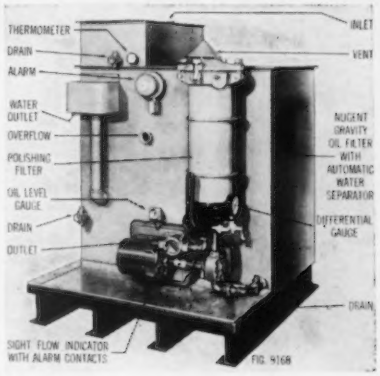


welding or special techniques are required. Pipe can be cut to length with hacksaw or brick saw, and a screwdriver and wrench are the only other tools needed for quick installation. Bolt circles provide easy connection to valves, tanks and existing pipelines.

The furane plastic pipe is available in 15-ft. lengths in seven sizes with wall thicknesses from 5/16 in. to 8/16-in., and from 2-in. to 12-in. I.D. Also offered are 90° and 45° ells, tees, and reducers. The resin used to manufacture the pipe a furfuryl alcohol resin, Durez 16470, produced by the Durez Plastics Division of Hooker Chemical Corp. For further information about Eonite pipe, its properties and its industrial uses, write to Cornelius A. Rauh & Associates, Inc., 1191 Sunset View Drive, Akron 13, Ohio.

System Filters Steam Turbine Lubricating Oils

A packaged lubricating oil filtering system for use with steam turbine installations is now available



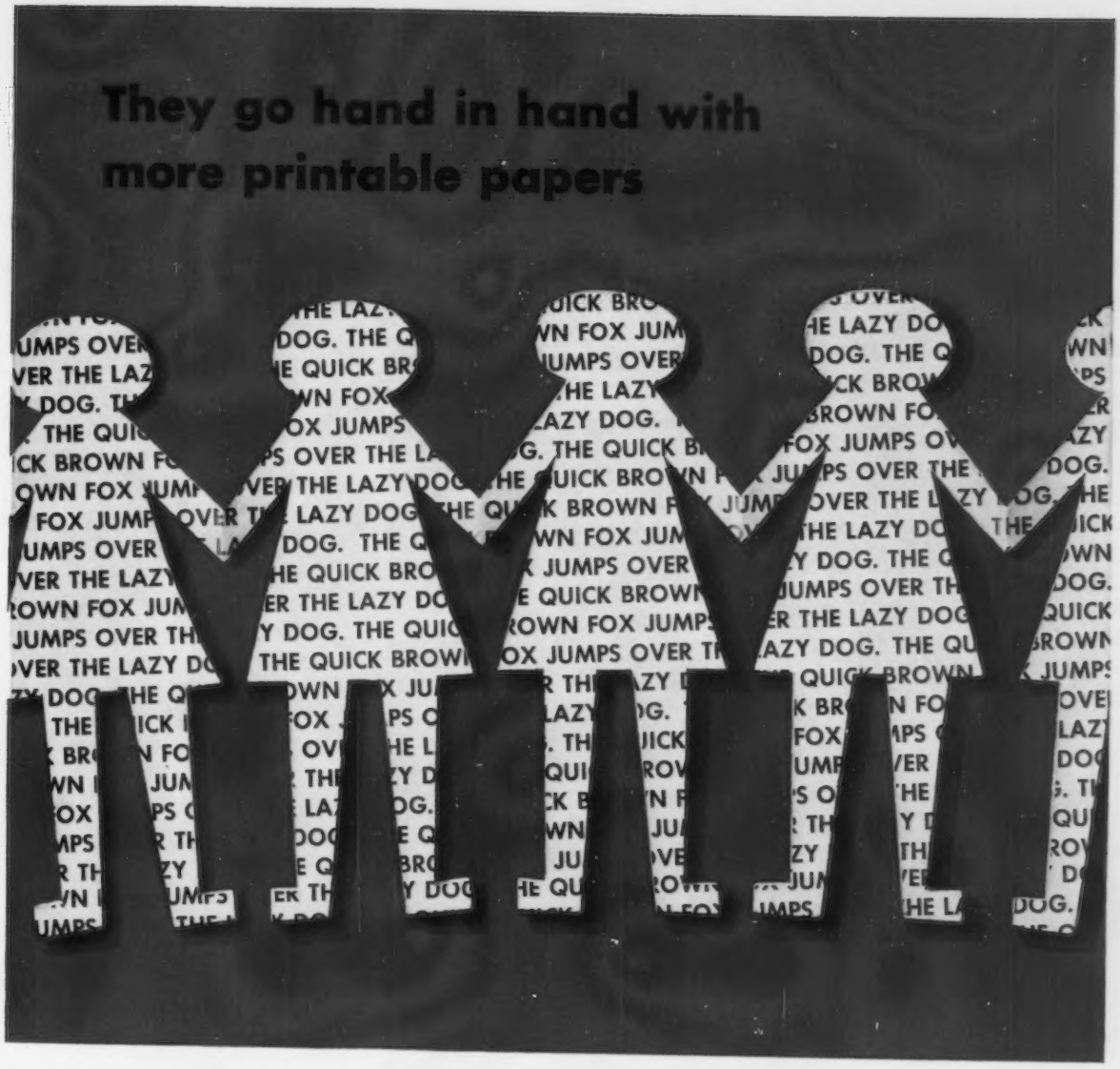
from Wm. W. Nugent & Co., Inc. Capacities range from 40 to over 2000 U.S. g.p.m. The system incorporates automatic control and indicating accessories to report malfunctions to a distant control station. The units require only periodic maintenance.

The dry type automatic water separating gravity filter incorporates a heating (or cooling) coil to maintain proper oil temperature, an alarm for remote indication of overflowing or of dirty filter bags, thermometer and oil level gauge. These filters may be operated continuously. They never require shut down for cleaning because they are made up of a series of filtering units, anyone of which may be removed independently of the others.

The circulating pump is a motor driven p.d. rotary oil pump with by-pass relief valve to regulate pump output pressure.

The polishing filter for removing fine solid particles and moisture haze is filled with absorbent cellulose. It incorporates an internal automatic by-pass relief and an external manual by-pass valve to allow changing of the filter recharge without stopping the continuous filtering process. It is also equipped with a three-way cock and pressure gauge to indicate the differential pressure and the recharge needs changing.

The sight flow indicator monitors



GELVA® C-3 and C-5 polyvinyl acetate resins

GELVA C-3 and C-5 Copolymer Resins applied from ammonia solutions provide improved wet strength, surface erasability, ink receptivity, surface gloss and grease and abrasion resistance. Add to these . . . increased Mullen, wax pick, tensile and fold strength, plus easy broke recovery, and you have the reason for the rapidly increasing use of these products by the paper industry.

Coast-to-coast warehousing, Shawinigan's large staff of research chemists who are ready to help you with your particular problems, and highly trained field representatives add up to an organization that can help you improve your products and your profits. Write to Shawinigan Resins Corporation, Dept. 7R, Springfield 1, Massachusetts.

SALES OFFICES: ATLANTA CHICAGO LOS ANGELES NEW YORK CLEVELAND SAN FRANCISCO GREENSBORO ST. LOUIS

GELVA® *polyvinyl acetate resins by* **SHAWINIGAN RESINS**®

the flow of filtered oil from the polishing filter to the turbine oil reservoir. Should the flow stop, the indicating gate will sound an alarm.

All of the above apparatus are valved and piped together. All are mounted on a single base with drip pan under the piping, pump and polishing filter. Installation is simple. Pipe the dirty oil from the turbine to the gravity filter inlet. Pipe the filtered oil from the sight flow indicator to the turbine oil reservoir of distributing system. Pipe the water discharge to the sewer. Complete information may be secured by writing Wm. W. Nugent & Co., Inc., 3440 Cleveland St., Skokie, Ill., and ask for Bulletin 14F.

Roll Grinding Aid Provides Smoother Surface

A rubber-covered roll grinding aid has been made available by Stowe-Woodward, Inc. Called Sto-Talc, it is said to provide a smoother roll surface for grinding, dry up tacky roll surfaces and minimize loading up of the grinding wheel. On softer type rolls it facilitates the use of crown recording instruments and provides more accurate readings.

Samples of Sto-Talc are available in a small, dispenser type pack to interested parties. It can be obtained through the Product Service Department at Stowe-Woodward, Inc., Newton Upper Falls, Mass.

Starch, In Granular Form, Is Dustless, Needs Less Enzyme

A dustless high-density, flash-dried starch in granular form has been specially developed for the paper industry by the Corn Products Co., 10 East 56th Street, New York 22, N. Y. Designated Globe Brand Easy-Enz #3387, the coating and sizing starch offers five basic advantages: (1) it stores more compactly, (2) wets out quickly and converts completely with less enzyme, (3) is more uniform in particle size, moisture content and pH, (4) reduces housekeeping costs, (5) is easier to convert.

The firm particles resist abrasion and are therefore virtually dustless when being handled in bags, or by bulk handling systems. The higher density of the starch also makes it possible to store 10 per cent more in the same space, compared to conventional type starches. Bags of starch are flatter and therefore stack more easily. Its dustless nature assures complete emptying of bags and consequently less loss of starch.

The starch wets out readily. Changes in present formulas using corn starch are not necessary. However, because of the composition of the starch it has been found that it requires less enzyme per pound of starch for conversion. The starch is reputed to convert more completely with less residue and it is said not to build up on the machine.

A lower conversion viscosity is characteristic of the new starch, ac-

SEEING IS BELIEVING

Printing has more sparkle and snap when your papers are treated with LEMOLS, Borden's new, high-quality polyvinyl alcohols. Made by a new process, Borden's polyvinyl alcohols for papermakers are purer, clearer, and easier to mix. LEMOLS *improve* dry and wet strengths, transparency, gloss, dimensional stability, grease resistance, and increase ink holdout substantially. To improve the finish of your papers, ask a Borden technical representative for a sample of the new LEMOLS. Write The Borden Chemical Company, Polyco-Monomer Department PT-70, 350 Madison Ave., New York 17, N. Y.

THE BORDEN CHEMICAL COMPANY ©TBC

©THE BORDEN COMPANY

cording to field trials. It peaks at a lower level during conversion and therefore less power is consumed. This factor also means that less power is required in mixer motors to meet the conventional brief peak load during conversion.

More Powerful Magnetic Separator Developed

Recently announced by Eriez Manufacturing Co. is a line of general-purpose plate magnets with increased

holding power. A one-inch diameter steel ball, presenting an actual contact surface little larger than the head of a pin, required a pull in excess of 28 pounds to remove from the face plate of one of the new magnets.

This superior power, it is said, lies in Eriez' development of a specially designed and energized Ceramic V magnetic material, Erium 25, affording a more intense concentration of magnetic strength adjacent to surface of the compact plate magnets. Eriez has designed the unit's entire all-welded steel and stainless steel construction to provide compact, tough and durable case.

Installed in chutes, spouts, ducts, feed tables, etc., or over screens and conveyors, the hinged case and integral handle of the Eriez Series 17 line facilitates periodic removal of iron from the face plate. Uniform dimensions make all models and strengths interchangeable; optional design features include stepped face plate, greater flange, offset for heavier chutes or to allow for gasketing, abrasion and corrosion-resistant construction, and liquid-tight face plates. Complete data may be obtained by writing Eriez Manufacturing Co., Erie 6, Penn.

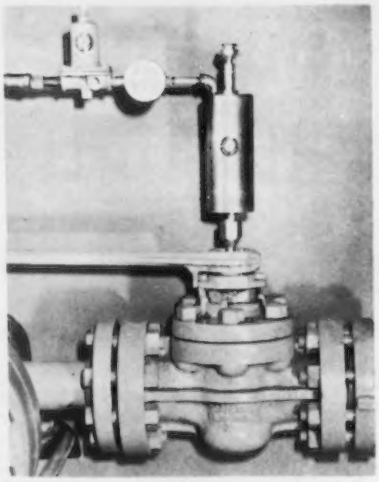
Valve Lubrication Is Automatic, Continuous

The Rockwell automatic pressurized lubricator is particularly applicable for remote plug valve installations where controlled and automatic continuous lubrication is a necessity. Since the lubricator is adjustable, it can be set to furnish lubricant only when the valve requires it, there is no waste.

Other advantages of the new lubricator include: a built-in refill indicator notes the position of the piston in the lubricator; remote control with a limit switch which triggers a warning system; elimination of plug sticking due to corrosion of the seating surface; lightweight of two lbs., eight ozs. with all working parts made of aluminum.

The lubricator consists of only three basic parts—piston, cylinder and lubricant chamber. Completing the unit is a Rockwell pressure regulator. In operation, the piston moves up and down inside the cylinder, telescoping itself over the tubular section of the lubricant chamber. The lubricant is stored only within the hollow piston shaft and lubricant chamber, not within the cylinder. Either air or gas not exceeding 250 p.s.i. inlet pressure to the pressure regulator can be used to operate the lubricator.

The complete assembly is 2⅝ in. in diameter and 13½ in. long and has a working capacity of 1.6 cu. in.,



the equivalent of two "C" sticks of lubricant. In general, its use is intended for valves not over six inches in size. For further information, write Rockwell Manufacturing Co., Meter and Valve Division, 400 North Lexington Ave., Pittsburgh 8, Pa.

Resin Useful In Greaseproof Coatings

Shawinigan Resins Corp. announces the availability of Resin D-566, a plasticized dispersion of a high viscosity polyvinyl butyral resin. Resin D-566 is potentially useful where a low tack, abrasion resistant, high strength film with high adhesion is required according to the announcement. It can also be combined with water soluble or water dispersible thermosetting resins. Suggested applications include greaseproof or washable coatings for paper.

Upon drying at elevated temperatures, Resin D-566 produces thermoplastic films having high adhesion to porous and non-porous surfaces. Films dried at room temperature are strippable, non-tacky, continuous, and water resistant. The plasticizer used in Resin D-566 is non-migratory and gives the film good heat and color stability. Elongation is only half that of the BR Dispersion.

Additional information may be obtained by writing Department HO, Shawinigan Resins Corp., Springfield, Mass.

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PROCESS STUDIES, DESIGN, SPECIFICATIONS, CONSTRUCTION SUPERVISION
PULP AND PAPER MILLS
STEAM, HYDRAULIC AND ELECTRICAL ENGINEERING REPORTS, CONSULTATION, VALUATIONS
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RUST "PACKAGE" CONTRACT
When planning new pulp and paper facilities consider our "package" contract. It provides a single source for site study, design and construction. Ask for details.
THE RUST ENGINEERING CO.
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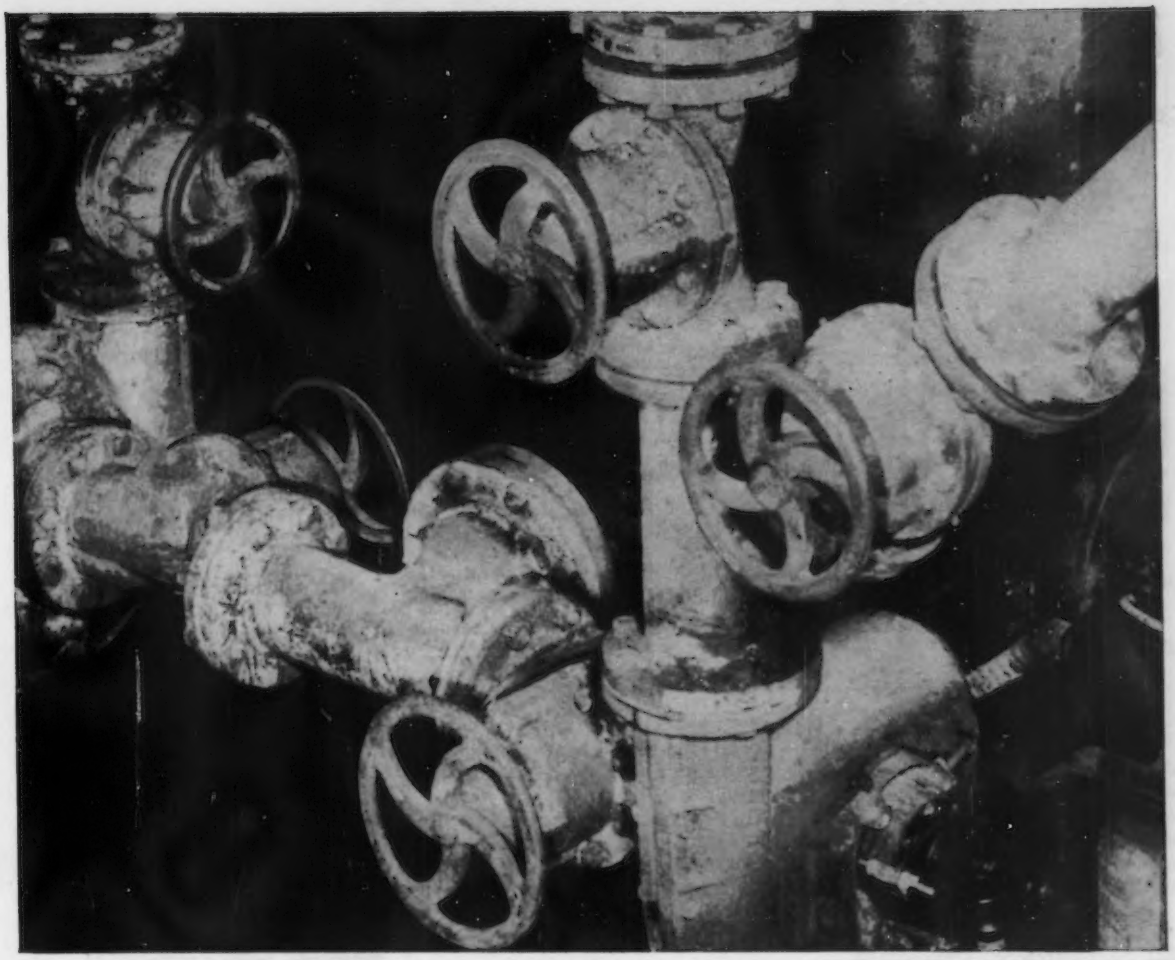


Cluster of 5 Grinnell-Saunders Valves in electrolytic plant of the S. D. Warren Company, Cumberland Mills, Maine, where chlorine solution is made. The 5" rubber-lined Grinnell valves with rubber diaphragms are on lines going from storage tanks to hardwood bleach. Valves here have been in use 9 years with very little service required.

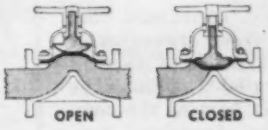
In use on chlorine lines 9 years with practically no maintenance!

It's the design of the Grinnell-Saunders Diaphragm Valve, plus selection of the correct body and diaphragm materials, which make it long-lasting.

The product in process is isolated from the valve's working mechanism at all times, so there can't possibly be any corrosion from that source. No product contamination can occur through contact with the operating mechanism, because the diaphragm effectively "seals off" the fluid in the line. The only part of the valve normally subject to wear is the diaphragm — which can easily be replaced without removing the valve from the line.

You can have Grinnell-Saunders Diaphragm Valves in a wide choice of body, lining and diaphragm materials. For further facts about Grinnell-Saunders Diaphragm Valves, see Grinnell's insert in Chemical Engineering Catalog, or Sweet's Plant Engineering File — or write directly to Grinnell Company, Providence 1, Rhode Island.

In the "open" position, the diaphragm lifts high for streamline flow in either direction.

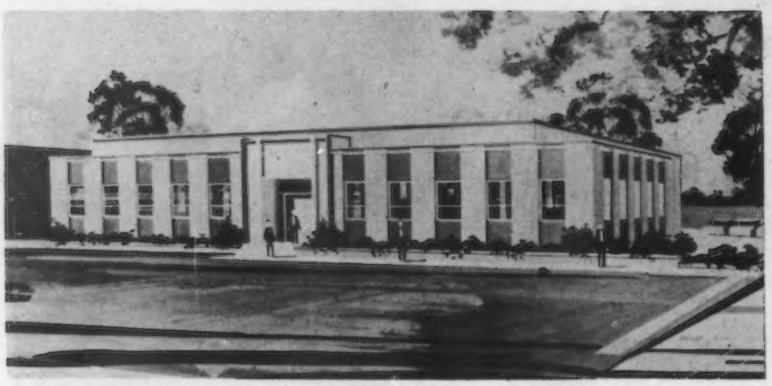


In the "closed" position, the resilient diaphragm seals tightly, even over fibrous particles and grit.

GRINNELL-SAUNDERS DIAPHRAGM VALVES

GRINNELL COMPANY, PROVIDENCE 1, R. I. • BRANCH WAREHOUSES AND DISTRIBUTORS FROM COAST TO COAST
PIPE FITTINGS • VALVES • PIPE HANGERS • PREFABRICATED PIPING • UNIT HEATERS • PIPING SPECIALTIES

PTJ NEWS OF SUPPLIERS



Foxboro Co.'s new regional sales headquarters and instrument shop at Chamblee Ga.

American Viscose Corp., Philadelphia, has opened the first Southeastern District sales office for its new Industrial Packaging department in Charlotte, N. C., and has named Alfred M. Lynch to the post of district manager.

Mr. Lynch is headquartered in AVC's Fibers Division sales office at 221 So. Church St., Charlotte 2.

The first product of American Viscose's new Industrial Packaging department is Avistrap Cord Strapping, a high-tenacity rayon cord which represents a new idea in industrial packaging.

The new Charlotte office is the sixth district sales office opened by AVC's Industrial Packaging department since Avistrap was first announced early in May 1960. Other district offices are located in Philadelphia, New York, Chicago, Columbus, Ohio, and New Orleans; at least four more district sales offices will be opened during 1960 and will include the Pacific Coast.

Bauer Bros. Co. announces that work is under way on expansion of manufacturing facilities at its main plant at Springfield, Ohio. The present project is part of the company's long range expansion program which is designed to provide maximum flexibility of operations.

In line with the long range expansion plan, Bauer has increased its laboratory and research facilities within the last year. Also, the Centri-Cleaner manufacturing department has been expanded recently.

In Canada, The Bauer Bros. Co. (Canada), Ltd., at Brantford, Ontario, has also completed expansion affecting all departments, including sales, service, research, engineering and manufacturing.

Goodyear Pumps, Inc., New York City, announces the signing of a manufacturing agreement with Warren Pumps, Inc., Warren, Mass., initiating the American production of the Goodyear Archimedean rubber-to-metal screw pump now supplied to the chemical, industrial, marine and fire fighting markets.

The Goodyear Pump is presently imported from England but increased demand by the process industries for this unique pumping principle offering pulseless, foamless flow as well as gentle handling of slurries without damage to suspended crystals, has necessitated manufacture of the pump in America.

Nationwide sales and distribution will be directed by Goodyear Pumps, Inc., through its present representatives and distributors. Full production is scheduled for early 1961 at Warren's Peace Dale, Rhode Island, plant.

Nalco Chemical Co.'s Industrial Division has advanced John B. Cruell to manager of its Southern California district, replacing J. T. Nicholson, who has resigned. Nalco's Southern California district headquarters are in Glendale.

Mr. Cruell, formerly area manager of Nalco's New York City office, joined the company in 1955 as a field representative in the Texas district. He was promoted to area manager, New York City, in January 1959.

John H. Gallagher, service representative in Nalco's Eastern district, has been promoted to manager of the New York City office, succeeding Mr. Cruell.

"I hear they now have papermaking machines that run faster than 3000 f.p.m. How many f.p.m. are we doing.

R. W. Lull

R. W. Miner

American Cyanamid Co. has appointed R. W. Lull manager of technical service and R. W. Miner manager of sales development of its paper chemicals department.

Mr. Lull joined Cyanamid's paper chemicals department in 1949 and has held various technical service and sales posts as the company's Stamford research laboratories, at New York headquarters and most recently in the Northwest.

Mr. Miner joined Cyanamid in 1947 as a research chemist. He has served in a variety of research development posts at the company's Stamford laboratories as well as technical sales and service assignments in the market development and petrochemicals departments.

L. E. Hackett

Morton Hacker

Stanley Steel Strapping, division of The Stanley Works, New Britain, Conn., has appointed Linwood E. Hackett sales representative in Maine and New Hampshire.

Huyck Felt Co., Division of Huyck Corp., Rensselaer, N. Y., announces that Morton Hacker has joined the Research and Development department as research engineer.

Mr. Hacker, a graduate of Lowell Technological Institute, has more than ten years of industrial textile experience. In his new assignment he will work primarily on the development of needled felts for the papermaking industry. He will be trained in the application of needled felts to paper machines and will work closely with paper mills throughout the country. Previously he was employed by Johnson and Johnson and the United States Testing Co.

Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

		June 4	June 11	June 18	June 25	July 2
	1960	96.1r	99.0	100.0r	96.5r	88.2
		June 6	June 13	June 20	June 27	July 4
	1959	94.2	95.6	96.7	96.0	71.7

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	96.7	97.9	98.3	97.0	97.5‡	96.0‡	—	—	—	—	—	—	—
1959	87.8	90.5	93.2	94.4	95.5	95.6	84.5	96.0	92.4	97.4	96.2	86.6	94.0

‡ Preliminary

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

COMPARATIVE YEARLY SUMMARIES

	1953	1954	1955	1956	1957	1958	1959	1960
Year to Date	94.2	93.1	97.2	99.7	92.9	86.6	91.9	97.3
Year Average	92.3	91.6	96.2	97.9	90.4	87.0	94.0	—

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn. Figures

COMPARATIVE WEEKLY SUMMARIES

		June 4	June 11	June 18	June 25	July 2
	1960	85	96	93	94	90
		June 6	June 13	June 20	June 27	July 4
	1959	88	98	98	98	82

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	92	95	94	92	94	92†	—	—	—	—	—	—	—
1959	89	94	95	94	96	96	83	97	92	96	94	80	92

† *Per cents of operation based on "inch-hours" reported on a 6-day basis to the National Paperboard Association.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	THIS WEEK ENDING July 2, 1960	LAST WEEK ENDING June 25, 1960	CUMULATIVE TO DATE Jan. 1 to July 2, 1960, incl.
% Activity	90%	94%	93%
Total	308,618	323,223	8,175,357
Containerboard—Domestic Use	160,941	161,484	4,179,726
Liner	105,925	104,558	2,780,740
Corrugating Material	50,035	51,023	1,261,109
Chip & Filler Board	4,981	5,903	137,877
Boxboard—Domestic Use	91,092	106,002	2,566,854
Folding	52,354	64,833	1,538,549
Set-Up	11,984	11,120	293,673
Special Food Board	26,754	30,049	734,632
Other Paperboard	56,585	55,737	1,428,777
Containerboard Type	29,666	25,800	677,967
Boxboard Type	26,919	29,937	750,810
Total Orders			
Received	317,772	314,504	
Unfilled End of Week	450,185	435,798	

Alvin H. Johnson & Co.

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NEW LITERATURE

Asphalt, Tar and Pitch

Suggests a number of interesting ways in which these ancient raw materials may be incorporated into modern products. Their valuable properties and low cost are strong arguments for their continued exploitation in new and old products. Booklet. Client Relations Dept., Foster D. Snell, Inc., 29 West 15th St., New York 11, N. Y.

Aluminum Buyers Guide

Contains quick facts on aluminum coil, sheet, plate, tubing, pipe, rod and bar available from stock with guide to selection. Technical Bulletin 30-1. Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.

Automatic Metal Banding

Provides illustrated sales copy on banding, tools and accessories. Bulletin. Automatic Metal Banding Co., 1440 East Davis St., Arlington Heights, Ill.

Automatic Self-Cleaning Strainer

Provides detailed information on the Kinney Model "A" automatic self-cleaning strainer which removes fine suspended particles from all types of water and other liquids, disposing of these particles in a continuous manner. Also shows three types of available straining media. Bulletin. S. P. Kinney, 201 2nd Ave., P. O. Box 445, Carnegie, Pa.

B-I-F Omega Table Feeder

Covers features, advantages, description and operation, feed range and capacities, accessories and dimensions for Model 0050-04. Bulletin 50.20-2. B-I-F Industries, P. O. Box 1342, Providence 1, R. I.

Electrical Systems Cabinets

Illustrates standard cabinets for installation of Bailey electric control systems, Metrotype information systems, and analog computing equipment. Specification G71-6. Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio.

Improved Paper Coatings

Describes Dow Latex 630, a new type of latex binder for pigmented paper and board coatings. This has excellent starch compatability, mechanical stability and pick resistance greatly improved over that of previous binders in the same cost range. Technical Bulletin. Dow Chemical Co., Plastics Dept., Midland, Mich.

Universal Tester

Describes the TMI Family of Universal Compression Testers. One of these testers combined with various attachments can perform over 15 different tests. Brochure. Testing Machines, Inc., 72 Jericho Turnpike, Mineola, N. Y.

Where to Use Permacel Products

Contains listings for every major type of industry and business in the country, showing which are used for specific applications in each industry. Pocket size booklet. Permacel, New Brunswick, N. J.

Industrial Trucks

Exide offers a library of information on how much it costs to own and operate various types of industrial trucks. One bulletin tells why we use battery electric industrial trucks and another contains graphs and charts on costs and a practical approach to propane and electric industrial truck cost studies. Bulletins. Exide Industrial Div., Electric Storage Battery Co., Rising Sun and Adams Aves., Philadelphia 20, Pa.

Paper Trade Journal Binder

We have been asked if there is a binder available which will hold copies of the magazine neat, safe and convenient for reference. We find that binders that will hold 12 copies of PAPER TRADE JOURNAL would cost $4.00 each including postage and handling, if you send the money with your order. If we bill you there will be an additional $.50 charge.

If there is sufficient interest expressed, we will order some of these binders for resale. Please reply to: Binders — Circulation, Paper Trade Journal, 49 W. 45th St., N. Y. 36, N. Y.

Variable Speed Drives

Describes Type RS P.I.V. variable speed drives, new constant horsepower variable speed drives, designed to meet capacity demands up to 50 h.p. and ratios up to 5.5:1. Folder 2874. Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

Electronic Select-A-Spede Drives

Describes the performance and operation of these drives which range in size from ¾ h.p. to 4 h.p. and feature a d.c. motor powered from a compact, wall mounted electronic control panel, which is controlled by an operator's control station. Bulletin 101. Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis.

Heavy Duty Trucks

Shows how this is designed for narrow aisle operation and features an exclusive motor wheel drive balanced by a patented offset caster wheel. Available in "reach fork" or straddle base fork models. Bulletin 621. Raymond Corp., Greene, N. Y.

Statistics of Paper — 1960

"The Statistics of Paper — 1960" is the seventh edition of this reference work to be published by the American Paper & Pulp Ass'n. In this edition the previously published historical series has been carried through 1958, and several new tabulations have been added. Preliminary data for 1959 is provided. Contents are as follows:

Pulpwood:
Receipts, Consumption and Inventories by Regions; Consumption by States; Imports and Exports by Quantity and Value

Wood Pulp:
Production by Major Classification and States; Imports, Exports and New Supply by Major Classifications

Waste Fibrous Materials:
Receipts, Consumption and Inventories; Imports and Exports by Kind

Paper and Paperboard Production;
Production by Grade and States

Paper and Paperboard Capacity:
Total and by Grades

Imports of Paper, Paperboard and Paper Products;
Total and by Grades

Exports of Paper, Paperboard and Paper Products:
Total and by Grades

New Supply and Consumption of Paper and Paperboard:
Total and by Major Grades

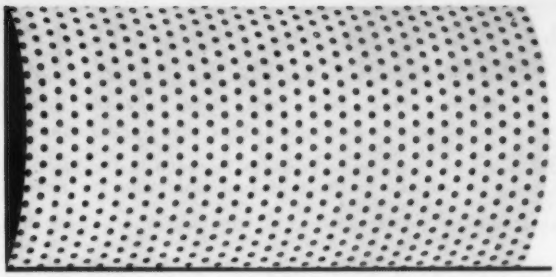
Data From 1954 Census of Manufactures

Financial Data:
Paper and Allied Products Industry

Prices, Wage Rates, Employment:
Paper and Allied Products Industry

Miscellaneous:
Community Dependency Study
Forestry Data

The previous editions of "The Statistics of Paper" have proven it a valuable medium for market research and general industry analysis. Price is $10.00 from American Paper and Pulp Ass'n., 122 East 42nd Street, New York 17, N. Y.



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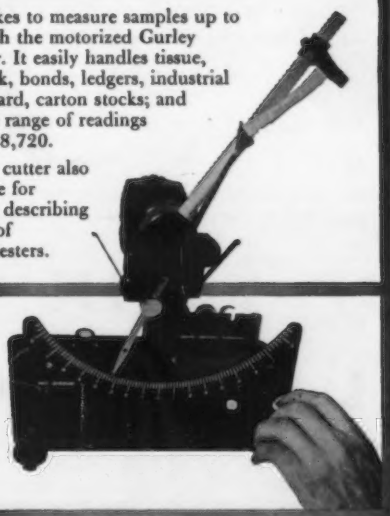

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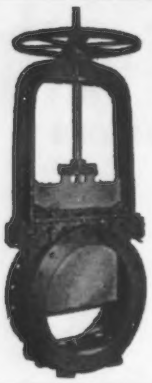

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METALS — I.B.B.M. all iron, bronze or stainless steels, body parts plain or rubber lined.

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- The "FAST THREADED" screw stem and ball bearing speeds valve operation.
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- Replaceable gate edge shoes are used in valves 10" and larger. These shoes are of special value when valves are installed stem and pipe horizontal.

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For every operation in spraying, from the heavy impact needed in debarking to the exactly controlled volume, distribution and spray angle essential in web spraying . . . Spraying Systems spray nozzles offer many advantages. Choice of capacities and selection of types is far greater in range . . . exclusive design features result in better performance. For complete information write for Catalog 24.

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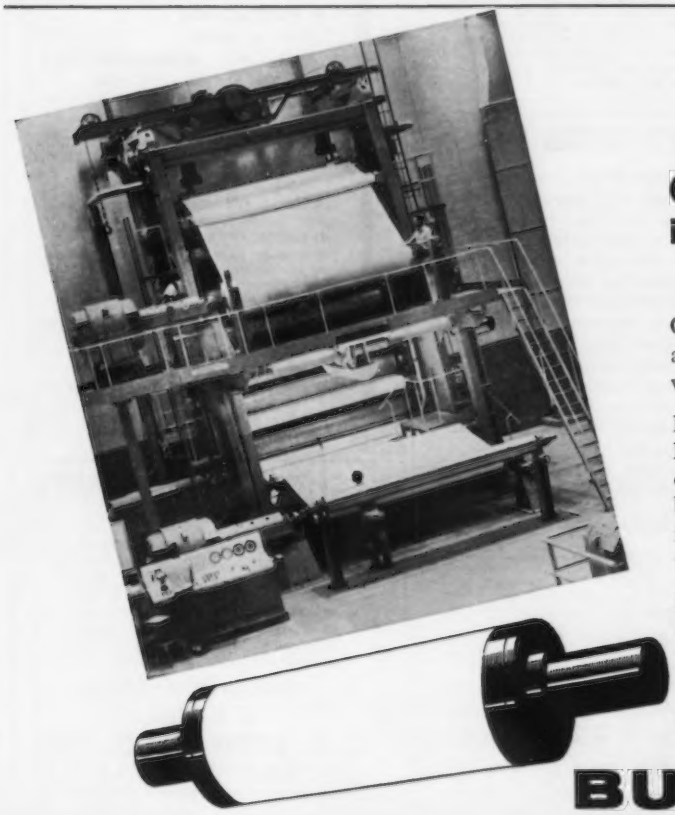

GREAT NAMES
in the Paper Industry:
Oxford Paper Co.

Oxford Paper Company's new Supercalender at Rumford, Maine, is equipped with Butterworth Calender Rolls.

Butterworth Rolls, used by the leaders in the Paper Industry, are made to specification and checked for hardness, smoothness, and density before delivery. You can see the difference in finer finishes, extra hours of service without turning down or refilling.

Furnished new or refilled for every calendering need. And you get Butterworth Rolls at competitive prices. Quotations on request.

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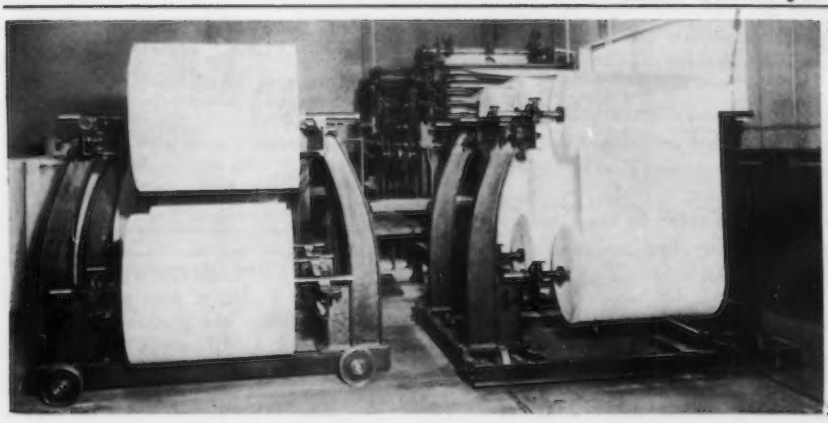
More than 60 years of Roll-Making Experience



HAMBLET'S New Double Backstand on Tracks or Turntable . . .

. . . eliminates down-time for shafting and roll loading, increases cutter production 50%, manually or electrically operated.

HAMBLET
MACHINE COMPANY
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Paper men ourselves, and the only recognized professional specialists in the world in our particular field, we assist responsible paper men to accelerate their careers by uncovering and developing THE SPECIFIC SITUATION that most exactly fits the needs of each individual we serve.

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Help Wanted

BETTER POSITIONS

$6000 to $35,000. Want a substantial salary increase, more opportunity or different location? This national 49 year old service connects you with best openings. You pay us only nominal fee for negotiations; This we refund when employer pays placement fee. Present position protected. In complete confidence, write for particulars. R. W. Bixby, Inc., 563 Brisbane Bldg., Buffalo 3, N. Y. J-18

PROCESS CONTROL ENGINEER

An established paper company in the East with expanding manufacturing facilities presents an excellent job opportunity for a chemical, mechanical or electrical engineer interested in developing in the field of process control.

Position demands personable, tactful, individual with willingness to progress. Assignments relate to test, raw material evaluation, process and product improvement. Kindly submit resumé and salary requirements.

Address Box 60-141, care Paper Trade Journal.

J-18

Help Wanted

PAPER MEN

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• SALES
• MANAGEMENT

Find the job—at Cadillac

In all phases of the Paper, Container and Packaging Industries, through Cadillac the applicant has a choice of the finest available positions.

Find the man—at Cadillac

A substantial number of qualified men are now listed with us and are available almost immediately.

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FRED J. STEFFENS
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CADILLAC ASSOCIATES, INC.
29 East Madison Bldg. Chicago 2, Illinois
Financial 6-9400

J-18

CHEMICAL SPECIALTY SALESMAN

We are looking for a young salesman with a paper background to work in the midwest out of our Chicago office. Position is newly created because of sales expansion in the paper industry and can lead to greater responsibilities. Products include defoamers, surfacants & etc.

REPLY IN CONFIDENCE

M. E. REINER
E. F. DREW & CO., INC.
15 E. 26 St., N. Y. 10, N. Y. J-18

BORED?

If you have a good knowledge of PAPERMAKING, either from production or technical support experience (or if you have been SELLING to the Paper Industry) you may qualify for a position in FIELD SERVICE with a highly regarded paper mill supplier.

This is a wonderful opportunity to put your knowledge and experience to work in the field you know the best and to get both the financial and professional recognition which you deserve.

Drop us a line telling of your experience and if it fits, you'll be invited to our headquarters—at our expense so that we can get to know each other better. We think you'll like what you see and hear!

Be assured that every precaution will be taken to keep your inquiry confidential. (For the information of men who are now selling to paper mills, our Sales personnel have been informed of this ad.)

Reply Box 60-155 care Paper Trade Journal.

J-25

WANTED
PLANT ENGINEER

Minimum of 3 to 5 years paper mill experience. Fourdrinier paper machines, 125 ton daily capacity. Located in Midwest. Excellent salary opportunity. Send resume. Replies will be held in strict confidence. Address Box 60-151 care Paper Trade Journal. J-25

SUPERINTENDENT

Folding Boxboard. Able assume complete charge one machine Mill. Outline full qualifications, salary expected first letter. Box 60-154, care Paper Trade Journal. A-1

Help Wanted advertisements continued on page 72

BARKING DRUM

1—12 ft. diameter x 45 ft. long

BEATERS

2—1500 lb. rag beaters, Valley Iron, bandless rolls, 54" x 48", cast iron tubs.

CALENDER STACKS

1—3 roll 84" calender stack.
1—4 roll 72" Calender Stack. (Extra heavy duty).
1—5 roll 82" face.
1—5 roll 86".

CHIPPERS

1—96" Murray 4 knife Chipper—anti-friction bearings.
1—84" 10 knife Carthage Chipper. Anti-friction bearings, with motor

COATER

1—42" Chapman Extrusion Type Coater

CONSISTENCY REGULATOR

1—Poirier Stainless Steel, new condition

CRUSHER & HAMMERMILL

1—Murray Chip Crusher.
1—Williams Hammermill.
1—Jeffrey Shredder.

CYLINDER MOLDS

1—30" diameter x 72" face.
5—36" diameter x 75" face, with couch rolls
1—36" diameter x 82" face.
3—36" diameter x 90" face, 18" diameter couch rolls.
3—42" diameter x 106" face.
2—60" dia. x 170" face.

DISINTEGRATOR

1—Shartle 8" disintegrator (new) with 125 horsepower induction motor (totally enclosed)

DRIVES

1—#6 Reeves vertical—anti friction bearings, totally enclosed.
1—Jones 21 H.P., ratio 10 to 1 (enclosed angle drive)
1—#4 Reeves Drive.
2—Waterbury Hydraulic Variable speed line shaft drives (from 40 to 100 H.P.)

DRYERS

1—16" diameter x 54" face (steel).
1—28" diameter x 84" face.
1—28" diameter x 48" face.
2—Calender Dryers, bronze, 30" x 128" with frames, gears & necessary rolls to make up the unit.
1—36" diameter x 44" face.
5—36" diameter x 76" face.
2—36" diameter x 84" face.
14—48" diameter x 48" face with bearings.
2—48" dia. x 52" face with frames, gears, bearings.
2—48" x 60" face with frames, gears & bearings
1—48" x 96" face.
6—48" diameter x 130" face.

EMBOSSING CALENDERS

1—43" 3-Roll Embossing Calender.
1—51½" 3-roll Smoothing Calender.
1—57" 3-roll Embossing Calender.
1—62" 2-roll Embosser.
1—90" 2-roll Smoothing Calender.

FILTER

1—Dorr-Oliver Filter, 3 ft. dia. x 6 ft. face, stainless steel construction, with pump.

FLAT SCREENS

1—12" Plate "Packer".

JORDANS

1—Jones Standard, new spare tackle, with 75 h.p. motor.
1—Noble & Wood Monarch, Type D, anti friction bearings.
1—Noble & Wood Baby Jordan, anti friction bearings, with 20 h.p. motor.

LABORATORY EQUIPMENT

1—4" face x 36" diameter Saveall
2—12" x 12" Sheet Molds
1—Washer for 5 lb. Beater.
1—24" Saveall, stainless steel.
1—20" Fourdrinier Wet End & Press Section.
2—8" x 8" Valley Sheet dryers.
1—12" x 12" Valley Sheet dryer.
1—18" x 20" Williams Sheet Dryer
1—15 lb. E. D. Jones Beater.
1—8" x 8" Valley Hydraulic Press.
1—Greene Freeness Tester.
1—Cady Micrometer.
1—High speed Jordan, anti-friction bearings.
7—Mullen Testers, motorized.
1—2 qt. Auto Clave. Stainless Steel.
2—Elmendorf Tear Testers.
1—Hermann Disintegrator (new).
1—27" High Solid Coater.
1—Noble & Wood Baby Jordan, anti friction bearings, with 20 h.p. motor.

MISCELLANEOUS

1—Bird Centriffler, built 1958, new condition.

MOTORS

4—25 h.p. Westinghouse, totally enclosed, ball bearing. 705 r.p.m

PRESS ROLLS

2—Chilled iron, chrome plated 9" x 72".
1—Chilled iron, chrome plated 10" x 74".

PULPERS

1—#1 Jones Pulp Master.
1—Black-Clawson Hydraslusher, 40 ton capacity, continuous type, new, never used.
1—Black-Clawson Hydraslusher, 40 ton capacity, continuous type, complete with pump, regulating box and 125 h.p. motor.

PUMPS

1—Economy Fan Pump 6000 g.p.m., 20' head, 50 h.p. motor.

REELS

1—72" Downingtown Reel, 2 bowl.
1—84" 3 bowl revolving reel.
1—86" 2 bowl reel.
1—100" Rice Barton 2 bowl Reel, heavy duty.
1—116" Downingtown, 2 bowl, anti friction bearings.
1—123"—3 bowl Revolving Reel.
1—134" 2 drum.

REFINERS

1—Rice Barton Dynofiner, details on request.
1—12" Wiener Refiner, with 200 h.p. motor.
2—36" Bauer double disc #185E Refiners, each with two 100 h.p. motors.

ROLLS

Felt, Table, Press, Breast, Couch, etc. Various sizes and types. (Bronze, Rubber, Iron, etc.)

ROTARY SCREENS

4—#2A Bird Rotary Screens, copper vats.
7—Trimbey, Senior Knotter Screens.
1—#2A—50 Bird, copper vat.
2—APMEW Rotary Pulp Screens.

SAVEALLS

1—24" Continuous Saveall, stainless steel.
1—LaMort 48" diameter x 82" face cylinder mold.
2—Savealls, cylinder molds, 42" diameter x 106" face, brand new vats.
2—Savealls, Rice Barton, cast iron vats, cylinder molds 48" diameter x 128" face, complete with 18" diameter couch rolls, all in very good condition.

SHEETERS

1—44" Spot Sheeter Complete
1—60" Hamblet with layboy.

SHREDDER

1—16" "Swift" Paper Shredder.

SLITTERS & WINDERS

4—42" Cameron Type 6.
1—42" Cameron Type 26-2A.
1—42" Cameron Type 40-2.
1—50" Cameron Type 6.
4—52" Cameron Type 9.
1—62" Cameron Type 6
1—72" Cameron Type 10 (Shear Cut)
1—86" Two Drum Moore & White 50" diameter rewind.
1—96" 4 drum Moore & White winder.
1—64" Waldron, Shear cut.

SLITTING DEVICE

84"—Quick change slitting device shear cut, complete.

STOCK PUMP

1—12 x 20 Shartle Triplex, with spare parts.

SUCTION COUCH SHELL

1—Downingtown suction couch shell only. 127½" face 26" diameter.

SUCTION COUCH ROLL

1—Beloit cantiliver type, 26" diameter by 120" maximum suction width, new 1955.
1—Beloit, 36" diameter x 246" face, SKF bearings.

SUCTION FELT ROLL

1—Gilbert & Nash 122" face.

SUCTION PRESS ROLL

1—Sandusky 18" dia. x 138" face Suction Press Roll.

SUPER CALENDER STACK

1—9 Roll 56".

TOILET WINDERS

1—72" Hudson-Sharp (Surface type winder).

VACUUM PUMPS

2—#1 Nash Hytor.
2—#3 Nash Hytor.
1—#6 Nash Hytor (Bronze)
1—#7 Nash Hytor, with 75 h.p. synchronous motor.
1—H-3 Nash.
1—K-5 Nash.
2—L-4 Nash.
1—L-5 Nash.
2—Connersville, 14 x 20.

VATS

2—Brand new Downingtown Iron End Vats, for 42" diameter x 112" face cylinder molds. Will cut down to your size.

WET MACHINES

1—84" Kamyr Complete Wet machine, complete with pumps, motors and drive.
1—96" Black-Clawson Wet Machine, complete with pumps, motors and drive; new, never used.

YANKEE DRYER

1—12 ft. diameter x 181½" face.

Paddy Ross, Pres.

J. J. ROSS COMPANY

377 Frelinghuysen Ave. Tel.—Bigelow 3-3720 Newark 12, N. J.

FLUID MECHANICS RESEARCH
HIGHEST PROFESSIONAL LEVEL

Requiring scientific ingenuity and creativeness of the highest professional order, this opening presents an intriguing opportunity for work in the field of instrumental measurement of the papermaking process.

As scientist and engineer for one of America's oldest and most respected companies, he will work without direct supervision but with the backing of a fine research organization and with the latest equipment; confined by only the very broadest discretionary limits in the use of his own judgment.

Located in a highly favored living area, this is truly an outstanding opportunity for the professionally-minded scientist **and** his family.

Education: This man may now be a Ph.D., or have equivalent experience in paper technology.

Experience: Since this long-range program is the first of its kind, experience is difficult to specify, but a competent understanding of papermaking with a flair for instrumentation techniques is essential.

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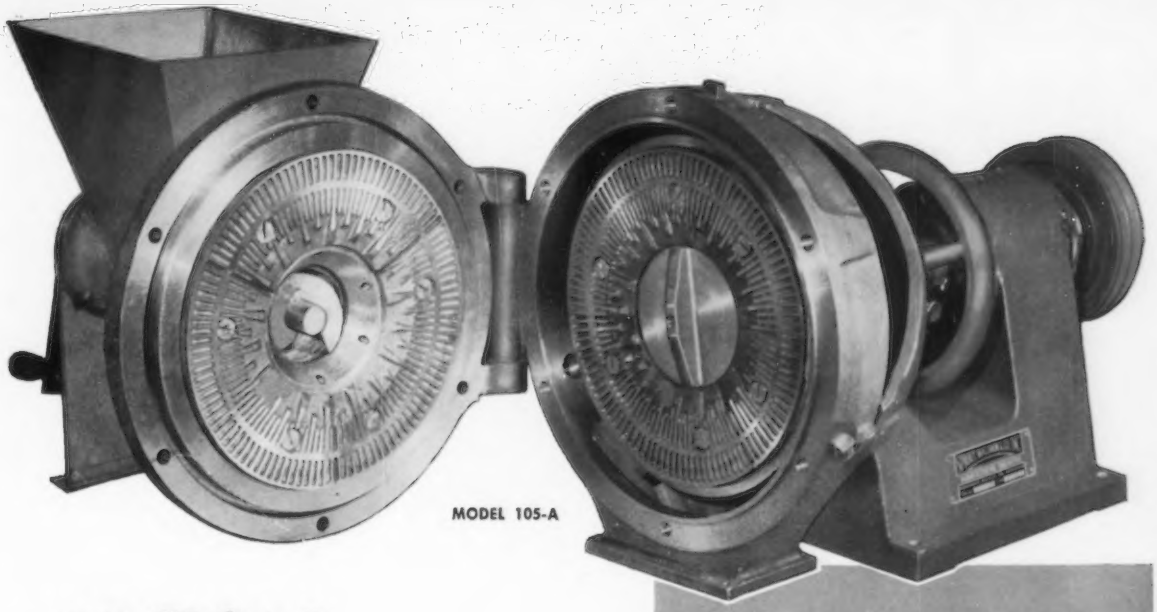

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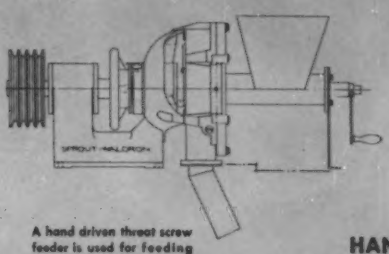

A hand driven thread screw feeder is used for feeding most materials in laboratory work.

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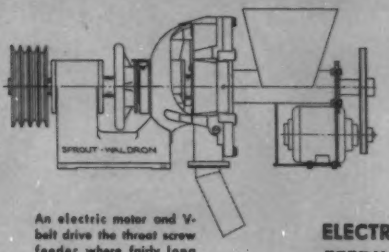

An electric motor and V-belt drive the thread screw feeder where fairly long runs are necessary.

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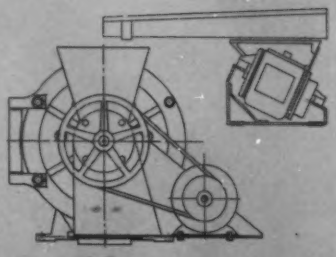

A magnetic vibratory feeder supplies a constant accurate flow of material.

MAGNETIC FEEDING

Feeding Arrangements MODEL 105-A

SPROUT, WALDRON & CO., INC.
PULP AND PAPER MILL DIVISION
MUNCY, PENNSYLVANIA, U. S. A.
REFINERS • CONVEYORS • FEEDERS • FIBER PRESSES
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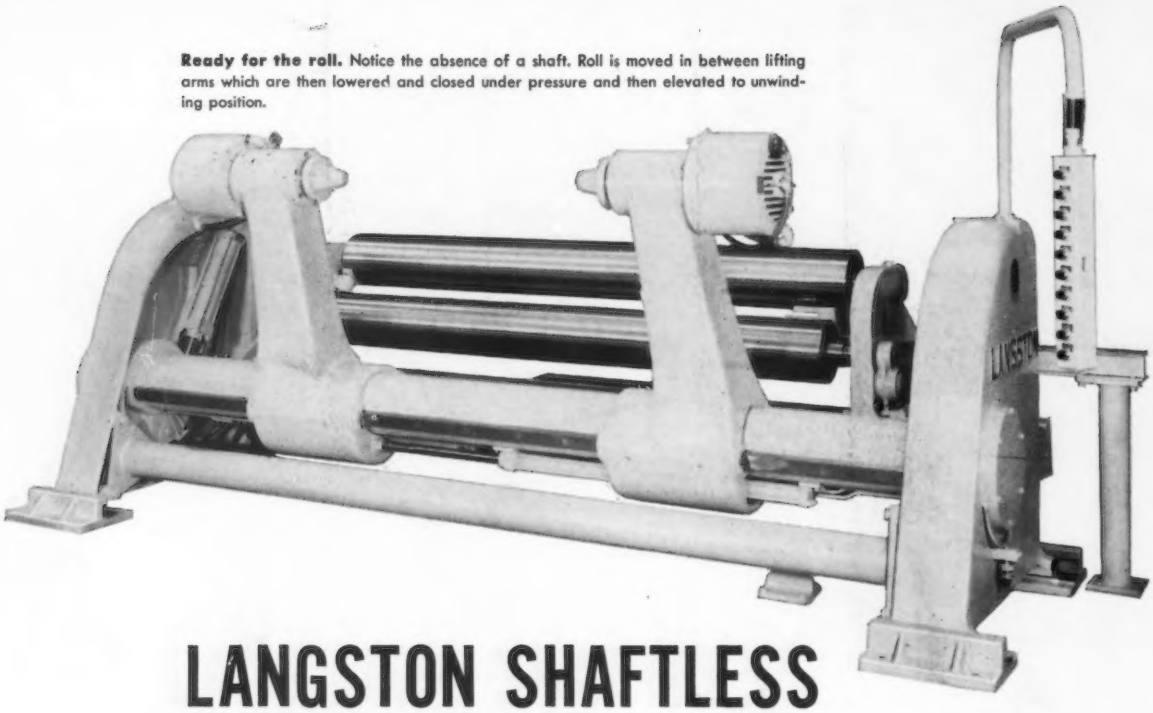
E/206

Ready for the roll. Notice the absence of a shaft. Roll is moved in between lifting arms which are then lowered and closed under pressure and then elevated to unwinding position.



LANGSTON SHAFTLESS UNWIND STAND

Boost your production . . . reduce your slitting and rewinding costs

Easy, fast, completely safe. One man does everything. Operating pushbutton controls, he closes lifting arms, elevates roll, sets brakes.

One man can load the heaviest roll. No heavy shaft to handle. No cone tightening. No couplings to engage. No crane lifting. Just pushbuttons. This is the Langston standard shaftless unwind stand for rewinding and converting applications.

You not only save time, you also get better unwinding. Roll can be positioned laterally by pushbutton control—even when the machine is running. It's held firmly under pressure for complete safety throughout the unwind. Several braking arrangements can be provided to handle a wide range of grades and conditions. Available extras provide for handling very narrow rolls; for constant tensioning; for automatic braking of idler rolls; for automatic web alignment and side register control; for web oscillation; and for local or remote control.

This new Langston shaftless unwind stand can be used with any make of slitter. Available for maximum roll widths from 36 to 140 in. and diameters from 14 to 84 in. For complete information, write Samuel M. Langston Co., Camden 4, N. J.

SHEAR CUT CLEAN CUT

LANGSTON *Leadership...by design*